

CLASS 83, CUTTING

SECTION I - CLASS DEFINITION

Class 83 is the residual locus of patents directed to methods and machines for penetrating material, without substantial reshaping flow of such material, by means of (1) a solid tool, or fluid current, either of which applies mechanical deforming force to the material by direct physical contact therewith, the fluid current forcing the material against a solid tool whose edge defines the line of cut; (2) a heated solid tool which directly engages the material (to effect penetration thereof by melting, or by transmission of mechanical energy, or both); or (3) opposed, controlled fluid currents.

(A) Specifically (as well as implicitly) excluded, is a patent to apparatus or process for cutting by the transmission of heat to the work material from a hot gas, such as flame cutting (for the location of which, see Lines With Other Classes, subsection A, Relationship to Other Classes Including, per se, Cutting, Severing, or Incising, paragraph 8, Classes related to flame or other heat-cutting).

(B) While a disclosure of the production of a reshaping flow, in the operation of its apparatus or accomplishment of its method, will preclude original placement of a patent in this class, a disclosure of a flow of the material which is inherent in, or purely incidental to, the act of cutting will not operate as such a bar. The following types of factual situations illustrate the rule:

(1) A disclosure that the work material flows, due to melting, will not preclude placement herein of the patent so disclosing; but the further teach-that the flow accomplishes a significant or definable reshaping of the work beyond that inherent in the penetration there-of will bar such placement. Exemplary of such reshaping is the formation of a rim or bead around a hole coincident with the penetration which forms the hole.

(2) A patent to a cutting machine or process employing a tool which, as disclosed, creates a flow of the material while penetrating the material only partially (that is, it fails to reach the surface opposite the surface of entry) will be excluded from this class only if there is a teaching from which it can be fairly inferred that there is no severance of the surface fibres of the work, but rather that the material is compacted, creased, forged or otherwise plastic worked, thus indicating that the reshaping is not an incident of a cutting operation. A disclosure that a "cutting" tool penetrates only partially through tacky, flowable, or green, plastic work material (such as soft

synthetic "plastics", food dough, etc.) will be considered to supply such a teaching, unless (by the same disclosure) the work attains its flowable or soft condition by the action of the cutting tool (e.g., a hot tool). If such tool is disclosed as softening or plasticizing the work, a patent directed to same would be proper for this class (83).

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

SCOPE OF CLASS 83

Class 83 is an elemental or basic class. That is, its subject matter is restricted (so far as possible) to means for, or steps of, accomplishing the following functions: cutting something (the "work"); or cutting, and handling the work to be cut; or cutting, and handling the product of the cutting operation. As a result, the great preponderance of patents directed to cutting combined with some other work treatment will be found in the respective class of the other treatment or in some more general class of combined operations, such as Class 156 or Class 29 (particularly subclasses 33+ and 566+). The few exceptions to this general statement are set forth explicitly in section II, Lines With Other Classes, subsection B, Relationship to Other Treating Classes (which appears later in this class definition).

The class does not act as the sole repository for patents directed to cutting machines or even to cutting machines of the functional types signaled in the subclasses of the class. Based upon past development of the system of patent classification, such patents are to be found in many classes, their disposition depending mainly upon the nature of the material disclosed as constituting work for the cutting operation. A listing of such classes is included in Lines With Other Classes, subsection A, Relationship to Other Classes Including, per se, Cutting, Severing, or Incising (which appears later in this class definition). With respect to such classes, Class 83 is residual.

As an incident of such residual nature, this class will not receive for original placement a patent disclosing alternative embodiments (claimed generically, or with a specific claim to each), one of a type proper for this class and one of a type related to another cutting class or subclass. Nor will it so receive a patent disclosing two purposes for a claimed cutting machine, one general or related to the art of this class (as shearing metal) and another specific to another cutting class or subclass (as, for instance, cutting plastic block or earthenware; or nail

making). In both such cases, the original patent will be placed in the other cutting class or subclass.

A. RELATIONSHIP TO OTHER CLASSES INCLUDING, PER SE, CUTTING, SEVERING, OR INCISING

The following enumeration and discussion of such classes, although including the loci of patents relating to many and varied types of cutting, does not purport to be exhaustive:

1. The class of cutting implements, Class 30.

Other than as governed by the exception set forth immediately following description 4 below, a patent is deemed to be directed to a cutting implement, and thus to be placeable originally in Class 30, if its claimed subject matter fits any one of following descriptions:

a. A cutting device which as an entirety is disclosed to be supported or held against the force of gravity by the operator during cutting.

b. A cutting device which as an entirety is disclosed as deriving from the work a substantial amount of its support against gravity (i.e., work-supported) during cutting, including a cutting device which is disclosed as being guided and supported during cutting by a member which is itself supported on the work (i) a cutting device which is disclosed as having a loose, work supported tool and powered means for driving the tool into the work, will be placed in Class 83; (ii) a cutting device which includes means to affix, hold, or positively locate a portion of the device relative to the work, for support of the device against gravity, and means to guide movement of the cutter relative to the work-affixed or work-located portion, will be placed in Class 83; (iii) a cutting device which includes (1) means to position or positively locate a portion of the device relative to the work in such a manner that said portion remains in said relative position during cutting and (2) means to guide the cutter in predetermined path with respect to said portion, will be placed in Class 83.

c. A cutting device which is disclosed as being capable of movement in a random path instantaneously under the control of the operator during cutting, including a cutter suspended or supported near the work; e.g., a cutter mounted at one end of a flexible shaft whose other end is anchored to a table, or a cutter suspended from a trolley, or a cutter mounted on a steerable vehicle.

d. A cutting device of the type referred to in the preceding paragraph in combination with a work support or

work holder wherein neither the cutting tool itself nor the tool support is modified or constructed to either constrain the motion of the cutter or to guide it in a predetermined path with respect to the work support or work holder.

However, a patent drawn to a device including a cutting tool and means to support a reserve stock of the work in which the work supply is in the form of a web or strand wrapped upon itself and the supply is supported for rotation upon an axis will be placed originally in this class (83) even though it fits one or more of the above listed descriptions.

A patent for the combination of a cutting device meeting any of the criteria set forth above and a work holder provided for in Class 269 will be placed originally in Class 30, although a patent for the work holder, per se, will be placed in Class 269.

A patent which only claims a cutting tool nominally, that is, in which the claimed structure does not sufficiently define a cutting tool substantially in its ultimate use form, or elements, adjuncts, or materials structurally limited to such use, is regarded as proper subject matter for original placement in Class 428, Stock Material or Miscellaneous Articles.

2. The class of severing by tearing or breaking.

Class 225 includes patents for process or apparatus for severing determinate portions of work material by causing failure of the work under tension at the point or line of separation, effected by moving one part of the work relative to another part. In such devices or processes, the tension is applied by stretching, bending, twisting, manually or mechanically grasping the work on one side of a fixed edge and forcing it against the edge, or moving a breaking or tearing tool and supported work material relative to each other. Also included in the reference class are tearing or breaking devices combined with any other type of severing means.

For a detailed statement of the distinction between Classes 83 and 225, see the (1) Note and (2) Note under section I, Class Definition, subsection B, Breaking or Tearing, of Class 225.

3. The class of comminuting.

Class 241, Solid Material Comminution or Disintegration, includes original patents for process or apparatus directed to the cutting or severing of solid material into a number of smaller solid masses, which smaller masses

do not have imparted to them any desired or significant shape. As between Classes 83 and 241, the provision of means for (or steps of) retaining an original dimension of the work in the cut up product will exclude a patent for the apparatus (or process) from Class 241.

4. The class of selective cutting.

The art of selective cutting is collected in Class 234, Selective Cutting (e.g., Punching). The distinction between a selective cutting device or a method of selective cutting (either of which is proper for Class 234) and a cutting means or method of this class (83) is set forth in the following statement:

Class 234 is superior to Class 83, and takes or contains original patents directed to cutting devices as defined in Class 83 which are further distinguished by the claimed inclusion of a plurality of cutting tool pairs and an actuating power train for each pair (one power train may be common to all), so that power may be delivered to any or all pairs for any cutting cycle, and wherein each and all of the tool pairs assembled in the machine are constantly available to be chosen for cutting or noncutting (in any desired number, from one to the total number available) by (a) a pattern (b) combinational coding means [defined in section III, Glossary, of the class definition of Class 234, Selective Cutting (e.g., Punching)], or (c) means not a part of the tool actuating power train and which does not partake of all the movements of either tool or the pair; which pattern or means conditions which pair so chosen to (a) enable, or (b) prevent, a cutting operation thereby when its driving power train is actuated.

The distinction expressed above is intended to exclude from Class 234 patents for devices wherein, for example, (a) there is no distinct conditioning means [see U.S. Patent No. 682,197 (subclass 225 of Class 83) to Hollerith: each punch is selected and actuated by its individual key-connected linkage]; or (b) less than the whole number of tools is constantly available [see U.S. Patent No. 878,775 (subclass 552 of Class 83) to Colbert: a turret of tools]; or (c) the tool conditioning means move bodily with their associated tools [see U.S. Patent No. 746,625 (subclass 559 of Class 83) to Allen: manipulable locking pins are fixed to the tools]; and is intended to include, for example, devices wherein a tool-actuating power train common to all tools is tripped, manually or automatically, after operation of selected conditioning means [see U.S. Patent No. 1,110,261 (234/111) to Hollerith: initial depression of a key conditions one punch for actuation, and further depression of the key trips a common punch hammer or actuator], and devices

wherein a plurality of combinations of less than the total number of tools are actuated or conditioned for actuation, by coding means (see U.S. Patent No. 422,728 to Clark: a turret of coded interposers is positionable to select groups of tools from an array thereof).

5. The class of mechanical manufacturing (metal working).

The class of reference (29, Metal Working) includes patents for machines for bias cutting of tubular stock (subclasses 2.1+); shredding metal; e.g., metal wool making (subclass 4.51+); spiral cutting of flat stock (subclass 20.1); and filing (subclass 76.1). Patents for files and rasps are found in subclasses 78+.

6. The class of presses.

The class of reference, (100, Presses) includes patents for reciprocating press structures, which (as both claimed and disclosed) may perform, alternatively, a cutting operation or some other forming operation (such as forging, drawing, bending), as well as patents containing such equivocal disclosures of forming devices that the type of forming operation such devices are intended to perform cannot be ascertained accurately.

7. The class of abrading.

With few exceptions (such as those found in Class 132, Toilet), patents claiming a cutting means, or a step involving the use of a cutting means, which (as disclosed) is composed of crystalline material-removing particles, are placed originally in Class 451, Abrading.

8. Classes related to flame or other heat-cutting.

In addition to the classes enumerated below, it will be noted that subclasses 18.1+ of Class 33, Geometrical Instruments, contained original patents for flame-cutting scribes, and that Class 65, Glass Manufacturing, subclass 113, provides for glass preform treating including flame severing, and subclasses 269+ provides for glass-working means including flame severing means.

a. The class of metal treatment.

Subclasses 194+ of Class 148, Metal Treatment, includes original patents for methods of flame-cutting metals.

b. The class of metallurgical apparatus.

Original patents for flame-cutting apparatus are col-

lected in subclasses 48+ of Class 266, Metallurgical Apparatus. In addition, subclass 271 of Class 266 contains original patents for devices used for drilling or cutting taphole plugs of metallurgical furnaces.

c. The class of combustion.

Class 431, Combustion, contains original patents for a torch comprising a fluid fuel distributor and a feature which specializes it for producing a flame; e.g., pilot burner etc., or which depends on the heat generated by the flame to perform its function; e.g., vaporize fuel.

d. The class of electric heating.

Class 219, Electric Heating, includes original patents directed to methods or apparatus effective to sever, part, or burn or melt away, a portion of a workpiece without using a solid tool which engages and penetrates the work. Examples will be found in subclasses 68+.

e. The class of fluid sprinkling, spraying, and diffusing.

Class 239, Fluid Sprinkling, Spraying, and Diffusing, includes original patents for fluid distributing nozzles or tips, per se, even though disclosed as burners.

9. Classes related to the cutting of metal.

In addition to the classes enumerated herein, attention is invited to the discussion of patents directed to improvements in the flame- or heat-cutting arts, contained in paragraph H, above.

a. The class of nail making.

Patents directed to apparatus for cutting nails to shape are found as originals in subclasses 157+ and 192+ of Class 470, Threaded, Headed Fastener, or Washer Making: Process and Apparatus.

b. The class of chain, staple, and horseshoe making.

Cutting machines disclosed as being useful in making such products are the subject of patents in subclass 29 of Class 59, Chain, Staple, and Horseshoe Making.

c. The class of tool making.

A patent for a cutting machine or process employed in the manufacture of a tool will be found, as an original copy, in Class 76, Metal Tools and Implements, Making, (e.g., in subclasses 12+, 28, 29, 30, 31+, 37+, 82+).

d. The class of wireworking.

Patents for methods of, or means for, cutting wire will be found, as original copies, in many subclasses of Class 140, Wireworking, particularly subclasses 58+, 66, and 67.

e. The class of type casting.

Original copies of patents for machines or processes for cutting cast type are included in subclass 59 of Class 199, Type Casting.

f. A patent directed to cutting metal (or other hard substance whose cutting is not the subject of a subclass is some other class) will be placed originally in one of the following classes, if not earlier placed on the basis of product (e.g., nails) according to the criteria expressed:

i. Class 408, Cutting by Use of Rotating Axially Moving Tool, will take original patents to machines for making a hole, reducing the outside of a round workpiece, trepanning, screw threading either the outside or the inside of a tubular workpiece, as well as any other cutting operation by use of a tool turning about an axis and moving along that axis toward a workpiece; provided, there is no additional motion of the operating tool. Class 408 is intended to ultimately include all cutting in the manner provided in the definition of that class; however, not all classes have now been screened for art proper for Class 408. Included among the classes likely to include patents proper for Class 408 that have not been screened are Classes 82, 142, and 451.

ii. Class 82, Turning. Original patents for devices or processes for severing or cutting off work, wherein the cutting movements of tool and work relative to each other include (1) rotation of either or both about an axis passing through the work (except as provided for in Class 408) and (2) relative translation substantially normal to said axis, are in Class 82 as meeting the general concepts of "turning".

iii. Class 409, Gear Cutting, Milling, or Planing, includes original patents for a process and apparatus for shaping material, usually metal, by means of (1) a toothed rotary cutter to produce an article of desired configuration or (2) a nonrotary tool for making a series of comparatively light cuts or a series of such tools, between which tool(s) and the workpiece there is a relative reciprocatory movement in substantially a straight line. Generally, Class 409 is broad enough to take any patent for shaping by means of a toothed rotary cutter

not provided for in Class 77 or Class 82. Included in Class 409, subclasses 288+, is a patent for a single edge cutter device which shapes work (e.g., grooving, shaving, slotting, or flash trimming) by means of relative movement between tool and work in one or more passes. See (1) Note under Class 409, subclass 288.

10. Classes related to the cutting of wood.

a. The class of coopering.

Patents for machines adapted to cut barrels, or staves therefor, will be found as original copies in many subclasses of Class 147.

b. Other patents whose claimed method or apparatus is disclosed as being directed to the cutting of wood will be placed originally in the proper woodworking class; Class 142, Wood Turning; Class 144, Woodworking (including pencil sharpening in subclasses 28.1+); or Class 30, Cutlery (including pencil sharpening implements in subclasses 451+); except for patents directed to veneer-web or -sheet clippers (including those intended to cut a layer to be laminated) which are placed in this class (83).

11. Classes related (in whole or in part) to cutting the earth or the fruits thereof in situ, or well tubing imbedded in the earth.

A patent directed to a machine or process for accomplishing any one of the above enumerated purposes will be placed in the appropriate earth exploring or exploiting, or agricultural, class. A list (not intended as exhaustive) of such classes follows: 37, Excavating; 47, Plant Husbandry; 56, Harvesters; 111, Planting; 166, Wells; 171, Unearthing Plants or Buried Objects; 172, Earth Working (e.g., subclasses 13-22); 175, Boring or Penetrating the Earth; 299, Mining or In Situ Disintegration of Hard Material.

12. Classes related to the cutting of plastic material, stone, or hard glass.

A patent directed to apparatus for cutting plastic, green ceramic or cementitious preformed material will be found as an original in Class 83 unless shaping other than by cutting is involved. See Class 65, Glass Manufacturing, appropriate subclasses for a process of, or apparatus for, cutting or scoring glass combined with glassworking or treating, and subclass 133 for a process of severing a stream of molten glass and also see the collection of search notes under subclasses 112 and 133; Class 125, Stone Working, for stone cutting; Class 264,

Plastic and Nonmetallic Article Shaping or Treating: Processes, particularly subclasses 138+ for a process of plastic shaping by or with cutting; and Class 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, for means shaping or reshaping of plastic material combined with cutting means.

13. Classes related to the treatment, care, or handling of living animal (including human) bodies.

a. The class of surgery.

A patent directed to the cutting of a live animal body will be placed as an original copy in Class 128, Surgery.

b. The class of dentistry.

Original patents for devices for trimming plaster bases of dental models will be found in subclass 38 of Class 433, Dentistry.

c. The class of toilet.

Patents for cutting, scraping, or filing devices, disclosed as useful in manicure or pedicure operations, are placed originally in subclasses 75.4+ and 75.8 of Class 132.

d. The class of farriery.

The reference class (168), in subclass 48.1+, contains original patents to apparatus for sawing, milling, scraping, filing, or otherwise cutting animal hooves.

e. The class of fishing, trapping, and vermin destroying.

In addition to the typical fish hook and tackle therefor, the class of reference (43) contains patents for such cutting devices as spears and harpoons subclass 6 and impaling traps subclasses 77+.

14. Classes related to the preparation of food.

a. The class of butchery.

A patent directed to the cutting of the dead body of a previously living creature, preparatory to its use as food, will be found in Class 452, Butchering. For instance, patents relating to fowl beheading, carcass splitting, or fish cutting are found, respectively, in subclasses 12, 23, or 53+ thereof.

b. Bakery and confectionery type foods.

A manipulative process of shaping edibles combined

with preform severing is provided for in Class 99, Foods and Beverages: Apparatus, subclasses 450.1+ and 537+, whereas comparable apparatus is provided for in Class 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, appropriate subclasses. Cutting of edible preforms, per se, is provided for by Class 83 whereas severing of same by tearing or breaking is provided for by Class 225.

c. Other classes of food cutting.

A patent directed to one of the following types of food cutting will be placed originally in the appropriate food preparation class: Class 99, Foods and Beverages: Apparatus, for a cutting device which is adapted to a peculiar characteristic of the food, or wherein the cutting device separates distinguishable portions of the food, (e.g., leafy top portion, seeds, core, skin portion, eyes, etc.).

15. Classes related to the working of leather, skins, or hides.

a. The class of leather working.

Class 69, Leather Manufactures, includes patents directed to means and processes for splitting, skiving, defleshing, whitening, or buffing of hides or leather, and for cutting, (per se), in the production of certain articles typical of the class (e.g., leather straps, the subject of patents in subclass 17 of Class 69).

b. The class of boot and shoe making.

Patents for cutting means or methods specialized or peculiarly adapted to operation upon footgear are placed originally in Class 12, Boot and Shoe Making, particularly subclasses 27, 28, 40, 41.05, 41.7, 46, 47, 47.1, 57.5+, 62, and 85+.

16. Textile classes.

a. The class of cloth finishing.

Subclasses 7+ of Class 26, Textiles: Cloth Finishing, constitutes the locus of original patents limited to apparatus or process for severing threads or fibers projecting from textile fabrics. Such patents may relate, for instance, to shearing or to the cutting of float threads, pile loops, or weft ends.

b. The class of fiber preparation.

Patents for “tow-to-top” staplizing machines or methods

are placed originally in Class 19, Textiles: Fiber Preparation. The type of severance therein involved is that in which a bundle of filaments of indefinite length (termed “tow”) is subjected to a treatment which reduces the individual filaments to staple length fibers without disrupting the continuity or integrity of the bundle (which, when emerging from the machine or processes, is known as “top”). In Class 83, on the other hand, are found patents for machines or processes for the reduction of isolated individual filaments to staple length fibers (for instance, Beria-type cutters) or for the disruptive reduction of filament bundles to such fibers, in both cases without further textile treatment.

c. The class of weaving.

Original copies of patents for cutting devices mounted on loom parts (e.g., temple mounted cutters) are found in subclasses 302+ of Class 139.

d. The class of sewing machines.

Patents for cutting devices disclosed as attached to sewing machines will be found, as original copies, in subclasses 45 and 285-301 of Class 112.

e. The class of apparel apparatus.

Means for trimming the bottoms of dresses or skirts, for trimming hat brims, or for cutting (e.g., clipping) the nap of hats comprise subject matter of patents in subclasses 1.1, 16, and 19 of Class 223.

f. The general class of textiles.

Subclass 144 of the class of reference (28, Textiles) contains original patents for machines for making chenille yarn by cutting a woven fabric.

17. Classes pertaining to the communications and information arts.

a. The class of typewriters.

Subclasses 127+ and 135+ of Class 400, Typewriting Machines, includes original copies of patents drawn to keyboard operated means for cutting intelligence-bearing indicia, as, for instance, stencil cutting, and to processes utilizing such means.

b. The class of printing.

Generally speaking, the recording of intelligence by cutting is proper subject matter for Class 101, Printing.

More particularly, individual cases of cutting machines or method may be tested for aptness to Class 101 by reference to the following statements:

i. A patent for a machine or process for cutting on or adjacent the printed or written matter on a document to prevent unauthorized or fraudulent alteration of such matter due to the proximity of the cut surfaces to the printed or written matter (e.g., check protecting) will be placed originally in Class 101, subclasses 3.1+.

ii. A patent for a machine or process for cutting work in the form of a character, a design, or a pattern which will impart information to an observer is proper for Class 101, subclasses 3.1+, if a cut is disclosed as extending only part way through the thickness of the work (e.g., embossing). If all of the cuts forming such character, design, or pattern are disclosed as extending all the way through the thickness of the work, the patent will be found in Class 83.

iii. If in addition to a cutting machine or process of this class (83) there is claimed a means or step peculiar to Class 101, (e.g., the application of ink to the cutting tool to additionally outline or mark an aperture made by the punch), such addition has been considered sufficient to place a patent directed to such combination in Class 101, subclasses 3.1+. This is in accordance with the general rule that a patent for a combination of cutting with another treatment of the work will be placed in the class of the other treatment. (See subsection B, Relationship to Other Treating Classes, below).

iv. An original patent claiming both the process and apparatus for the manufacture of stencils by cutting, or only such process, will be found in Class 101, subclass 128.4.

c. The class of recorders.

A process or apparatus which would be otherwise proper for Class 346, Recorders, will not be removed from the scope of that class merely by virtue of the fact that the recordation, as claimed, is accomplished by an incising or penetrating means or method step.

d. The class of registers.

Original patents directed to means for cutting or punching a record medium, in response to the results of the operation of a calculating machine or register, will be found in Class 235, Registers, particularly subclasses 58+ and 60.27+ (especially subclass 60.29).

e. The class of railway signaling.

Patents for apparatus which cuts or punches a record medium, in response to the operation of a block-signal system or of a cab signal or train control device, are placed originally in subclasses 107 and 185 (respectively) of Class 246, Railway Switches and Signals.

f. The class of telegraphy.

A patent for a cutting device which is actuated by means responsive to a telegraphically transmitted signal will be placed originally in Class 178, Telegraphy, those in subclass 92 being typical.

g. The class of binder devices releasably engaging aperture or notch of sheet.

A sheet binder device of that class (402) (i) in combination with a discrete sheet aperture forming device, which device perforates a sheet prior to placing the same on the retainer, (ii) including means to force a sheet upon the sheet retainer and (iii) including a sheet retainer which penetrates and inserts a pliant strand through a sheet will be found in subclasses 1, 7, and 25, respectively, of Class 402.

18. Receptacle classes.

a. The class of deposit and collection receptacles.

Patents claiming a ticket receiving and collection receptacle, with means to punch or cut tickets introduced into the receptacle, will be found placed originally in Class 232, Deposit and Collection Receptacles.

b. The class of special receptacles.

Patents for cigar- or tobacco-containing receptacles having an attached cutter are placed originally in Class 206, Special Receptacle or Package, subclasses 238+.

c. The class of paper receptacles.

Original patents for paper receptacles with attached means for opening a receptacle by cutting, tearing, or ripping will be found in subclasses 87.05, 200+, and 307 of Class 229, Envelopes, Wrappers, and Paperboard Boxes.

d. The class of metallic receptacles.

Subclasses 265+ of Class 220, Receptacles, includes

original patents for general-utility receptacles with attached openers which function to open the receptacle by cutting part thereof.

19. Certain other classes distinguished by the nature or identity of work or product.

a. The class of tobacco.

Patents for machines which are disclosed as being specially adapted to the cutting of tobacco or cigars will be found, as original copies, in subclasses 248+ and 281 of Class 131. (Patents for tobacco cutting machines of more general utility are placed originally in appropriate subclasses of Classes 30 and 83).

b. The class of button making.

Patented machines or processes for cutting button blanks are disclosed in subclasses 15 and 16 of Class 79.

c. The class of brush, broom, and mop making.

The class of reference (300) includes a subclass (17) restricted to the, per se, trimming of articles of the class. Most of the devices represented by patents therein operate to accomplish such trimming by cutting.

d. The class of wheelwright machines.

Patents directed to machines and processes for lacerating or buffing the exterior surface of vehicle tires are collected in subclass 13 of Class 157, Wheelwright Machines, except those claiming an abrading means or step, which latter are to be found in Class 451, Abrading.

e. The class of ships.

Patents for ships carrying means to cut or break ice are placed originally in subclasses 40-42 of Class 114.

f. The class of chemical manufacture and adhesive bonding of articles.

Class, 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, provides in subclasses 625+ for severing a workpiece by the action of a reactive or solvent fluid. It also provides for the combination of laminating and cutting in subclasses 250+ and 510+.

20. The class of geometrical instruments.

Subclasses 18.1+ of Class 33, Geometrical Instruments,

include original patents for means for scoring or indenting a reference point, respectively.

B. RELATIONSHIP TO OTHER TREATING CLASSES

1. This class is an elementary class and generally does not include patents claiming the combination of a cutting method or means with a process or apparatus for other treatment(s). Certain specific exceptions to this general rule exist, as follows:

a. Heating or cooling work and cutting same.

Subject matter of subclasses 15+ and 170.

b. Cleaning work and cutting same;

subject matter of subclass 168.

2. Means for, or steps of, performing certain other operations whose character as treating or nontreating operations, it is recognized, will vary with individual judgement also are included in patents of this class in claimed combination with cutting instrumentalities or steps, as follows:

a. Weighing the cut product in subclass 77.

b. Separating or assorting product in subclasses 102+

c. Applying a transient, nonpropellant fluid (e.g., lubricant or coolant) to work in subclasses 22 and 169.

d. Temporarily deforming work; in subclasses 17+, 175, and 176.

e. Unwinding material from, or supporting material on, a spool, beam, bobbin, or the like, for presentation to a cutting device for operation thereon; note particularly subclasses 649+. (The combination of a cutting machine and significantly claimed means for winding the product thereof is subject matter for Class 242, Winding, Tensioning, or Guiding, as is the Combination of a winding machine and a means to cut the tail, extending from a package wound by such machine, from the source of material to be wound. See Class 242, subclasses 487.1+, 521, and 522+.

3. As to methods, the claimed recitation of a step of performing a treatment other than cutting will exclude a patent from original placement in this class, regardless of whether such treating step is claimed in detail.

4. In interpreting a claimed combination of cutting and noncutting treating means, a purely nominal recitation of the other (noncutting) treating means will not exclude an original patent from this class if all of the following conditions are met:

- a. No means or instrumentality is claimed as being synchronized with the other treating means.
- b. A single material handling means presents work to both such treating means; or, the means which presents material (as work) to a second treating means in line is the means which removes it (as product) from a first treating means in line.
- c. No support or guide means is claimed as orienting or redirecting the material (work or product) between treating means.

C. RELATIONSHIP TO MATERIAL HANDLING CLASSES

1. Product handling means.

a. This class (83) receives original patents claiming significantly both a cutting tool of the class and means to separate or assort portions of the product resulting from the cutting operation. An original patent claiming such separating or assorting means in structural terms, and the cutting tool in nominal terms only, will be placed in Class 209, Classifying, Separating, and Assorting Solids.

b. Original patents drawn to the combination of cutting means of this class and product weighing means which does not govern the operation of the cutting means will be placed in this class (83) without regard to the degree of specificity with which the cutting means is claimed therein. If the weighing means is claimed as controlling a cutting device, which cutting device terminates feed or flow of material to the weighing means, a patent thereto is placed originally in Class 177, Weighing Scales.

c. As to other product handling devices (i.e., instrumentalities which effect or affect motion of the product of a cutting machine), the claimed combination of such device with a cutting machine constitutes subject matter for this class (83), regardless of the degree of specificity with which the cutting means is claimed.

2. Work handling means.

a. As between this class (83) and Classes 193, Convey-

ors, Chutes, Skids, Guides, and Ways; 198, Conveyors: Power-Driven; 212, Traversing Hoists; 414, Material or Article Handling; 226, Advancing Material of Indeterminate Length; 406, Conveyors: Fluid Current; and 271, Sheet Feeding or Delivering; the claimed recitation in purely nominal terms, of a cutting instrumentality with respect to which a work handling means may move or feed work will not of itself exclude placement of an original patent for such work handling means in the respective material handling class listed above. However, when such instrumentality is set forth with structural specificity, the claimed congregation of elements is properly placed with the work modifying instrumentality (class 83). For example: A claim reciting a structurally defined work handling means (not claimed as synchronized with a work modifying means), and a "work station" (or "tool station", or "work modifying means", or "tool", or "cutter", or "punch", or "knife", etc.) in so many words, is properly placed on the basis of the work handling means. A claim reciting a work handling means and, for instance, a work station including a "reciprocating tool element", or a "tapered tool", or a "round cutter", or a "rotary punch", is properly placed in the class of the specific tool set forth. The true test for proper placement in this class (83) is whether or not the combination of a tool and work-feed means is a significant tool-to-work-relationship. For further notes on this relationship see (2) Note, under subclass 703 of this class (83) referring to Class 414.

c. Further, this class (83) receives original patents claiming a cutting tool (of the type provided for in the class) synchronized with or in power-transmitting driving relation with, a work handling means, regardless of whether such tool is claimed significantly or merely nominally.

3. Tool handling means.

Class 483 provides for a Class 83 cutting process or apparatus combined with tool changing.

D. RELATIONSHIP TO CLASS OF TOOL DRIVING OR IMPACTING

Class 173, Tool Driving or Impacting, provides for subject matter directed to driving or impacting a tool, when such subject matter includes combined features peculiar to tool driving, but which does not include features limiting the subject matter to a specific tool art such as specific shape of the work contacting portion of a tool, related tools, or an opposed work support. Class 83 has not been cleared as to subject matter in conflict with this line.

E. RELATIONSHIP TO THE CLASS OF WORK HOLDERS

This relationship is set forth in section II, Lines With Other Classes, of the class definition for Class 269.

F. STRUCTURE OF THE CLASS

1. A perusal of the first line or skeleton schedule of the class will reveal that the class is composed of a relatively small number of major subclass groups. Generally, in order of superiority, these major subclass groups provide search fields for:

a. a method including a step of cutting (subclasses 13-56).

b. noncyclic means to halt or prevent motion of a part or all of a cutting machine (subclasses 58-68).

c. means to monitor and control operation of a cutting machine (subclasses 72-76).

d. means to handle the product of a cutting operation (subclasses 78-166).

e. means to cut hollow work from the inside (subclasses 178-195).

f. means to cut work while cyclically halted (subclasses 202-283).

g. a flying cutter (subclasses 284-349).

h. a cutter (of a type other than those previously enumerated) synchronized with work moving means (subclasses 350-357).

i. a cutting machine with an appurtenance such as a clamp, work stop or gauge, work guide; firstly, synchronized with the tool cycle (subclasses 373-398), and secondly, not so synchronized (subclasses 438-468).

j. means to control the operation of a part (at least) of the machine in response to means to sense the work, product, or another part of the machine (subclasses 358-372, 399, 400).

k. a cutting machine having work moving means not claimed as synchronized with the tool cycle; providing for tool-station-type work moving means (subclasses 401 through 437.7).

l. a rotatable disc type cutting machine (subclasses 469-508).

m. means to produce or facilitate the cutting motion of a tool or tools (subclasses 513-519; 523-647).

n. a cutting tool, per se, or combined with its support (subclasses 651-699.61).

o. a method of, or means for, cutting other than all the way through the work thickness-wise, providing for scoring, skiving, and related operations (subclasses 6-12).

2. In addition, a limited number of groupings have been established on secondary bases of classification, to facilitate state-of-the-art searches. These subclasses, which contain no original patents are numbered from 901.

The following index is provided for convenience in locating certain elements or types of cutting machines according to keywords generally of art terminology. This index is not intended to be exhaustive.

SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS

SEE OR SEARCH THIS CLASS, SUBCLASS:

72+,	for automation.
278,	391+, 401+, 467.1, for back gage.
788+,	for band saw.
562,	640, for beam dinker.
531+,	561, 658+, for bed block.
403,	for beria-type cutter.
788+,	for chain saw.
182,	206, 262, 282, 294, 319, 325, 375+, 409, 422, 452+, for clamp.
531+,	652+, for clicker die.
32,	42+, 50, for core lamination making.
288,	for crop cut.
638,	643, 644, for draw cut.
425.2+,	for edge-cutter.
111+,	for ejector.
284+,	for flying cutter.
218,	278, for four-motion feed.
572,	573, for gag.
	See back gage for gage
598,	620+, for gang punch.
450,	(also see clamp and stripper), for holddown.
915.3,	for ice cutting.
102.1,	for kerf spreading.
637,	for leader pin.

305, for miscut.
 746+, for miter box.
 237, 916, 917, for nibble.
 169, for oiler.
 333, 918, for pinkin.
 See clamp and holddown for presser foot.
 213, 214, 255, 256, 519, 611, 622, 636, for progressive cutting.
 616, for punch hammer.
 703+, for saw-mill dog.
 401+, for saw-mill feed.
 830+, 835+, for saw-teeth.
 923, for scrap cutter.
 174+, for sharpener (tool).
 223+, 582+, for spring storage (cutter, punch).
 111+, for stripper.
 637, for sub-press unit.
 477+, 483+, for table saw.
 353, 483+, 614, for traveling cutter.

SECTION IV - GLOSSARY

ANVIL

A tool comprising a smooth-faced, imperforate member, the smooth face having the purpose of contacting the work and providing a reaction surface against which a relatively movable tool may abut in its work penetrating movement.

DETECTOR

A mechanism for sensing a physical property or characteristic of, or the presence or absence or passage of, the work or the product or a movable element of a machine; which mechanism effects a signal or impulse as a result of such sensing. The signal or impulse is sent through a transmitter, (see definition of "transmitter" below) and effects or initiates the functioning of a machine part or assembly controlled by the detector.

FLYING

Moving with the work material. The term "flying" means that the part so described has, at the time of cutting, a motion component in the direction of the work as it moves to and through the cutting station.

GUIDE

Passive means to direct the movement of something (e.g., work, product, machine part) in a desired path. (Note: although a guide may be movable for the pur-

pose of adjustment, yet it accomplishes its directing function by presenting an obstacle to movement in an undesired direction, rather than by causing the directed thing or part to move with it).

NOTCHING

The cutting of a discrete product from a workpiece through the thickness of the workpiece with the line of cut starting at an edge of the workpiece and returning to the same edge. The edge of the workpiece may be either an exterior edge or an interior edge. A cut which extends solely along a single straight line is not considered to be a notching cut.

PRODUCT

Material which has been treated by the cutting tool; the result of a cutting operation. (Note: material which is "product" for one cutting operation may be "work" for an ensuing operation).

PUNCHING

The cutting of a discrete product out of the confines of a workpiece through the thickness of the workpiece so that the cut does not intersect any edge (exterior or interior) of the workpiece.

SHEARING

Cutting effected by the relative motion of two cutting tools having edges which are initially on opposite sides of the work with the cutting taking place by one tool moving towards the other tool and the edge on the moving tool moving past and in close and overlapping relationship to the edge of the other tool.

TOOL

The instrumentality that contacts the work for effecting directly the operation of the class either by itself or by cooperation with another tool.

TOOL CYCLE

The elapsed time between, and all of the motion traced by the tool between, the time the tool leaves any particular datum point in its approach to (or recession from) the work until it again leaves that point in its next succeeding approach to (or recession from) the work, the location of such datum point for a series of recurring cycles being determined without giving significance to mere positioning movements of the tool with respect to the

work (Note: positioning movements of the tool are considered to be part of the cycle of motions constituting the tool cycle, and the time they occupy is part of the span of the cycle. They are disregarded only for the purpose of establishing the datum point of one cycle with respect to that of a preceding or succeeding cycle).

TOOL PAIR

A plurality of tools, each having a work contacting portion, said portions being initially separated from each other and cooperating to effect cutting of the work when they have relative movement toward each other.

TOOL STROKE

The motion of the tool toward and into the work to effect a cut, and the motion of retraction of the tool from the product to its base position.

TOOL SUPPORT

An element connected to the tool for supporting it against gravity and that partakes of all of the movement of the tool and has no relative movement with respect to the tool except for purposes of adjustment.

TRANSMITTER

A system for sending the signal or impulse which has been effected by a detector (see definition of "detector" above) to a means for establishing (in response to receipt of such signal or impulse) a driving connection between a source of power and a machine part or assembly; or sending such signal or impulse to a part or assembly directly (as by a linkage).

WORK

Article, material, or stuff to be treated (cut). (Compare "product").

WORK-FEED MEANS

An instrumentality for advancing work to the treating (cutting) zone.

WORK THICKNESS

In general, the least dimension along a substantially planar outer surface of work. As to hollow workpieces, the thickness dimension at an annular section is taken as the wall thickness; at a solid section, it is the thickness of the entire workpiece as though it were not hollow. The

thickness dimension of a strand is defined as follows: (a) as to those of circular, triangular or elliptical cross-section, by any line passing through the strand from surface point to surface point, (b) as to those of other polygonal cross-section, by any line passing through the strand from one outer surface to a nonintersecting outer surface. As to spheres a line extending through the sphere from one point on the surface to another is deemed to define the thickness dimension. As to all other shapes of work pieces, thickness is not considered significant for the purpose of this classification.

Throughout the definitions of subclasses herein below, the appearance of an asterisk (*) will indicate a word or term which has been defined in this section. However, the words "product", "tool", and "work", defined in this section, occur so frequently in the subclass definitions, that the use of the asterisk in reference thereto has been omitted.

SUBCLASSES

13 This subclass is indented under the class definition. Method which includes a step of cutting.

- (1) Note. A step of cutting, as herein applied, consists in moving a tool and work into contact with and relative to each other such that the tool moves entirely through the thickness of the work. Once the cut through the wall thickness has been achieved, then, an interruption of said relative movement, or of cutting contact extending throughout said wall thickness, shall be construed as a termination of said "step".
- (2) Note. A special exception to the limitations expressed in these definitions (i.e., the limitations which require a moving tool and/or an edge backup member) exists in the case of wherein sound waves (e.g., supersonic sound) cause work to be cut through its thickness. Such a step will be proper for this class and this subclass as a process of cutting.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 701, for the corresponding apparatus.
861, and 866 through 880, for methods of cutting but generally not completely through work thickness.

- SEE OR SEARCH CLASS:
 29, Metal Working, subclass 557 for process of shaping a one piece blank which includes a step of severing.
 234, Selective Cutting (e.g., Punching), subclasses 1+ for a method of selective cutting.
- 14** This subclass is indented under subclass 13. Process which includes a step, either before or during the cutting step, of performing an operation (other than a cutting operation) which changes the shape or state of the work, which change of shape or state facilitates the cutting.
- (1) Note. The operation may either facilitate the operation of the tool upon the work or effect a necessary or desired change of shape of the work with respect to the tool.
- (2) Note. Included in this subclass (14) are processes which recite a step of placing the work under tension or compression; however, applying such force for the purpose of merely immobilizing the work, as by clamping, has not been considered a treatment step to admit the patent to this subclass. Such patents are classified below on other steps of their method.
- SEE OR SEARCH CLASS:
 451, Abrading, subclass 35 and 54+ for a process of abrading including ancillary treatment of work.
- 15** This subclass is indented under subclass 14. Process which includes a step of increasing or decreasing the temperature of the work.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 170+, for apparatus for modifying or controlling the temperature of the tool or work.
- SEE OR SEARCH CLASS:
 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 138+ for molding or shaping processes within the class definition
- when combined with a cutting or severing step.
- 451, Abrading, subclass 33 and 53 for a process of abrading including temperature modification or control of work or abradant.
- 16** This subclass is indented under subclass 15. Process in which the treatment is confined to a specific portion of the work, as by applying a heated tool on the line on which the separation is effected.
- SEE OR SEARCH CLASS:
 219, Electric Heating, subclasses 260+ for a process of burning a hole by means of electrically generated heat, and subclasses 69.1+ for a process of cutting by means of an electric arc.
- 17** This subclass is indented under subclass 14. Process which includes a step of temporarily altering the shape or dimension of the work within the cutting zone and concurrently with the cutting operation.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 175, and 176, for corresponding apparatus.
- 18** This subclass is indented under subclass 17. Process which includes a step of subjecting the work to forces which are directed away from each other (i.e., tensile forces) to elongate the work.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 175, for corresponding apparatus.
- 19** This subclass is indented under subclass 17. Process which includes a step of subjecting the work to forces directed toward each other, which forces density, reduces the volume, or reduces a dimension of the work.
- 20** This subclass is indented under subclass 17. Process which includes a step of bending the work by engaging the work with a tool so as to thereby distort or deform the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 18, for a process of both stretching and flexing the work by contacting the work with a tool.
- 19, for a process of both compressing and flexing the work by contacting the work with a tool.

21 This subclass is indented under subclass 20. Process which includes a step of subjecting the work to bending forces which direct the work toward a tool so as to compel the work to assume the shape of the tool.

22 This subclass is indented under subclass 14. Process in which the treatment includes contacting the work with a fluid or gas.

- (1) Note. This subclass includes methods of applying a lubricant to the tool or work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 15+, for process of heating or cooling by a fluid application.
- 17+, for process of distorting the work by fluid pressure before or during the cutting step.
- 24, for process of subsequently handling the produce by fluid application.
- 53, for process of cutting by the direct application of fluid pressure to the work.
- 169, for corresponding apparatus.
- 402, for apparatus to move work by fluid current.

23 This subclass is indented under subclass 13. Process which includes a step of manipulating a product resulting from the severing step.

- (1) Note. Moving cut work between claimed cutting steps has been considered work-feeding rather than subsequent handling of a product; and patents thereto have been placed below on the basis of other steps.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 39+, for a method including the feeding of work from one tool station to another; and see the Notes thereto.
- 78+, for corresponding apparatus.

24 This subclass is indented under subclass 23. Process in which the manipulation of the product is effected by contacting the product with a gas or liquid.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 98+, for corresponding apparatus.
- 402, for apparatus to move work by fluid current.

SEE OR SEARCH CLASS:

- 226, Advancing Material of Indeterminate Length, may include a nominal recitation of a supply or take-up coil (e.g., less than a support for such a coil or a cooperative relationship between a tension or exhaust detector* and reel driving or reel stopping means, etc.), subclass 7 for a process of or subclasses 97.1+ for apparatus using fluid current to advance the material.

25 This subclass is indented under subclass 23. Process which includes a step of holding or replacing the product in the workpiece from which it was separated.

- (1) Note. The retention or reinsertion is usually for the purpose of conveying the product away from the cutting station by means of the workpiece.
- (2) Note. This subclass has been designated a collecting place for disclosures of methods of, and means for, retaining a product in position in a workpiece.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 103, for apparatus for removing a reinserted product from cut work.
- 108, for apparatus for replacing a product in the workpiece from which it has been cut.

- 26** This subclass is indented under subclass 23. Process wherein the speed of product being delivered is increased with respect to that of the work being fed or with respect to the speed of an adjacent product piece.

(1) Note. Such process usually accomplishes the purpose of conveying the product away from the following work, or out of the path of a tool, or moving one product with respect to another product while both are moving away from the cutting zone.

- 27** This subclass is indented under subclass 23. Process which includes a step of moving one of a plurality of products with respect to the other.

(1) Note. The piece remaining in the cutting zone and unmoved after cutting has not been considered a product for purposes of this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

102+, for corresponding apparatus.

- 28** This subclass is indented under subclass 23. Process in which the work has an adhesive on one surface, which surface is adhered to a work holder to which the product remains adhered subsequent to the cutting step, and which includes a step of manipulating the support with the product adhered thereto.

SEE OR SEARCH CLASS:

225, Severing by Tearing or Breaking, subclasses 23+, for means to move tacky work to a tool station.

- 29** This subclass is indented under subclass 13. Process which includes a step of assembling workpieces one upon another prior to the cutting step, and cutting the assembled workpieces.

- 30** This subclass is indented under subclass 13. Process which includes a step of shaping an opening in the work, as by a sharp, pointed tool, so that no substantial amount of material is removed from the work; i.e., there is only one product.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

660, for a pointed perforating tool.

866+, for a perforating device, or method, which does not produce, or result in, complete penetration of work.

SEE OR SEARCH CLASS:

137, Fluid Handling, subclass 15.14 for a process of tapping a pipe or tank (e.g., gas main, water main, keg, etc.) having an aperture forming cutter or cutting tool.

428, Stock Material or Miscellaneous Articles, subclasses 596+ for metallic stock material having apertures; e.g., resulting from a puncturing operation.

- 31** This subclass is indented under subclass 13. Process which includes a step of positioning a wear preventing material between one tool of a tool pair and the work, and repositioning the material relative to both the tool and work between cutting steps.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

547+, for corresponding apparatus.

- 32** This subclass is indented under subclass 13. Process which includes a step of severing a plurality of products from a workpiece, each of which products has an interfitting portion which lies within a recess of the other product, the product portions which define the cooperating interfitting portions constituting the parts of the whole of a common area of the workpiece, and at least part of the separation being effected along the lines of the interfitting portions.

(1) Note. The mere longitudinal separation of a web of indefinite length into two or more ribbonlike products by means of an undulant cut, or the mere transverse separation of a product from a web of indefinite length by means of an undulant cut, is not considered sufficient to bring the patent within this subclass but will be found below in subclasses 48 and 56.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 48, for process of transversely separating products from the leading edge of the work by means of an undulant cut, and see (1) Note above.
 - 56, for process of separating the work longitudinally by means of an undulant line of cut, and see (1) Note above.
- 33** This subclass is indented under subclass 13. Process which includes the steps of effecting a cut upon the work and then utilizing that cut (as by engaging the edges thereof) or orient, locate, or feed the work with respect to a tool, for a subsequent cut.
- 34** This subclass is indented under subclass 13. Process which includes a step of shifting the tool intermediate successive cutting steps to rearrange or readjust the tool with respect to the work.
- (1) Note. The mere movement of the tool toward and from the work in its normal cutting cycle has not been considered reorienting. The reorientation is superimposed upon the tool stroke, resulting in such additional movements as a change from the previously normal path of the tool during the tool feeding cycle, and inversion of the tool, or an indexing of the tool.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 35+, for process which includes reorienting the work between cuts.
 - 215+, for apparatus for imparting a plurality of motions to a tool during its cutting cycle.
 - 556+, for tool positioning means synchronized with the cutting stroke.
- 35** This subclass is indented under subclass 13. Process which includes a step of shifting the work intermediate successive cutting steps to rearrange or readjust the work with respect to a tool or a cutting station.
- (1) Note. The mere advancement of the work into the cutting zone has been con-

sidered feeding rather than reorienting. The reorientation is superimposed upon the work-feeding motion, resulting in such additional movements as: a change in the path of an established direction of feed, an inversion of the work, or a turning end-for-end of the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 34, for process which includes reorienting the tool between cuts.
 - 219+, for apparatus for feeding the work in a plurality of directions.
 - 249, for apparatus to facilitate a manual repositioning of the work between cuts.
 - 256, for apparatus for changing the direction of work-feed between work stations.
 - 404+, for means to move work from one tool station to another.
- 36** This subclass is indented under subclass 35. Process wherein the reorientation is effected with respect to the tool which has accomplished the earlier of the successive cutting steps.
- 37** This subclass is indented under subclass 13. Process which includes a step of cutting while the work is moving through a cutting zone, which step includes moving the tool, at the time of cutting, in the direction the work is moving.

(1) Note. A method of slitting the work longitudinally of the direction of work movement by means of a rotatable disc tool has been excluded. Patents thereto will be found in subclass 56 below; whereas patents for slitting apparatus will be found in subclasses 426+.

(2) Note. Apparatus used to practice this process is usually called a flying cutter, patents to which will be found in subclasses 284+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 42+, for process of sequentially separating products from the leading edge of the work.

- 56, and see (1) Note above.
 284+, for corresponding apparatus.
 426+, and see (1) Note above.
- 38** This subclass is indented under subclass 37. Process which includes a step of changing either the speed of the tool during a portion of its cyclic travel, (i.e., toward, from, or concurrent with, the moving work) or the speed of the work as it traverses the cutting zone.
- (1) Note. Oscillating and reciprocating tools of necessity have a period of nonuniform rate of travel due to the reversals of direction. Since such tools inherently operate in this manner, patents for methods of operating them have not been included in this subclass and will be found in other subclasses indented under subclass 13. However, all patents for methods of operating unidirectionally moving rotary tools which start their cycle of movement from a position of rest have been placed here because of the difficulty distinguishing between rotary tools which stop and those which merely slow down.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 238+, for means to feed work unequally in recurring series.
 313, for a flying cutter with means for cyclically varying the work-feed speed.
 324, for a flying cutter with means for cyclically varying the tool speed of an orbitally moving tool.
 617, for a tool having means to vary the force or speed of the tool stroke.
- 39** This subclass is indented under subclass 13. Process which includes more than one cutting step as defined in (1) Note to subclass 13.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 34, for process of reorienting a tool between cutting steps.
 35+, for process of reorienting the work between cutting steps.
 213+, for plural tools successively actuated at the same cutting station.
- 255+, for plural tool stations of a subclass 202 type.
 404+, for means to move work between plural tool stations.
- 40** This subclass is indented under subclass 39. Process which includes a step of blanking, as defined in (1) Note to subclass 55, below; and further includes a step of making some other kind of cut.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 49, for process of making a progressive cut by a series of blanking operations.
 50, for process of repetitive blanking.
- 41** This subclass is indented under subclass 40. Process in which a series of blanking steps is accompanied by a cutting step which connects the blanked out areas.
- 42** This subclass is indented under subclass 39. Process which includes the steps of feeding the work to and through a cutting station and making serial cuts each of which separates a product(s) from the advancing edge of the work.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 37+, for a process of repetitive transverse severing from the leading edge of the work while the work is moving through the cutting station.
 202+, for an apparatus for cutting the work during a dwell in the work-feed.
 284+, for a flying cutter which may sever work transversely.
 350+, for a cutter synchronized with moving work, which may sever work transversely.
- 43** This subclass is indented under subclass 42. Process in which a product is separated from a portion only of the transverse extent of such advancing edge of the work, and the remaining portion of the transverse extent is subsequently severed in the formation of one or more separate products.
- 44** This subclass is indented under subclass 42. Process which includes a step of cutting the work along a line generally parallel to the direction of work-feed.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
408, for apparatus to accomplish the same purpose.
- 45** This subclass is indented under subclass 44. Process in which the longitudinal severing is accomplished by a series of cutting steps.
- 46** This subclass is indented under subclass 44. Process in which the longitudinal severing is along a side-to-side or wavy line of separation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
32, for process of cutting transversely of the work combined with longitudinal severing along a zigzag or wavy line where the cuts make interdigitating products.
45, for the combination of transverse and longitudinal severing in which a zigzag or wavy line of longitudinal separation is effected by plural cuts.
48, for process of nonrectilinear transverse cutting to sever a product from the leading edge of the work.
56, for process of making a zigzag or wavy line of separation.
333, for a rotatable tool having an undulant cutting edge.
- 47** This subclass is indented under subclass 44. Process wherein the step of longitudinal cutting is made before that of transverse cutting in the severance of each product piece from the advancing edge of the work.
- 48** This subclass is indented under subclass 42. Process wherein the line of cutting produced by the serial cuts does not define a straight line path.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
32, for process of cutting interdigitating products.
46, for process of making a nonrectilinear longitudinal cut and a transverse cut.
56, for process of making a continuing line of cut which may be undulant.
- 410+, for a work carrier guided in a nonrectilinear path, thus effecting a nonrectilinear cut.
- 49** This subclass is indented under subclass 39. Process which includes making a continuing line of cut by a series of cutting steps.
- (1) Note. The successive cuts may be effected by a single tool or by a plurality of tools mounted on a single carrier.
- (2) Note. A cutting step is defined in (1) Note to subclass 13.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
52, for process of effecting a progressive cut in increments during a single cutting step.
56, for process of making a continuing line of cut by a single step.
332, for apparatus including a segmented disc slitting or slotting tool effecting a progressive cut on moving work.
- 50** This subclass is indented under subclass 39. Process which includes a plurality of blanking steps as defined in (1) Note to the definition of subclass 55.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
32, for process of cutting interdigitating products by repetitive blanking steps.
34, for process of repetitive blanking wherein the tool is reoriented between cuts.
35+, for process of repetitive blanking wherein the work is reoriented between cuts.
40+, for process of blanking and cutting.
41, for process of blanking out a plurality of holes in a workpiece and cutting to join the holes.
45, for process of progressive slotting which comprises a series of blanking operations.
- 51** This subclass is indented under subclass 13. Process in which plural cutting tools penetrate work disposed between them and meet in cutting engagement interiorly of the work.

- (1) Note. Included are patents for process of “nipping”.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
566+, 600, and 623, for structure wherein each of two tools of a tool pair moves toward the other
- 52** This subclass is indented under subclass 13. Process which includes a step of making in a single cutting step, either (a) two or more cuts differing in kind (e.g., cut, slit, punch) or (b) similar cuts effected serially and overlapping in time.
- (1) Note. See (1) Note to subclass 13 for the definition of a cutting step.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
40+, for process of blanking and cutting in two or more steps.
49, for process of making a single continuous cut progressively through the work by a plurality of cutting steps.
56, for process of making a continuous cut by a single cutting step.
513+, for plural tools with individually actuated tool supports, and particularly subclass 519 for successively acting tools, and subclass 518 for diverse tools.
554+, for means driving a tool through plural steps in cutting strokes.
688, for a punch having spaced, successively operating, portions.
- 53** This subclass is indented under subclass 13. Process which includes the step of cutting solely by contacting the work with a pressure medium which conforms to the configuration of a passive supporting tool, on or against which the work is supported.
- (1) Note. The pressure medium may be liquid, gaseous or of a readily yieldable material such as rubber.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
177, for corresponding apparatus.
- 431, for means (which may be fluent means) to force work upon tool.
- SEE OR SEARCH CLASS:
451, Abrading, subclasses 28+ for a process of severing by abrading.
- 54** This subclass is indented under subclass 13. Process which includes a step of severing a cup, tube or the like.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
178+, for cutting apparatus which includes a tool within hollow work.
- SEE OR SEARCH CLASS:
82, Turning, subclass 47 for process of cutting hollow work while effecting relative rotary movement about an axis passing through the work, and subclass 82 for corresponding apparatus.
137, Fluid Handling, subclass 15.14 for a process of tapping a pipe or tank (e.g., gas main, water main, keg, etc.) having an aperture forming cutter or cutting tool.
- 55** This subclass is indented under subclass 13. Process which includes a step of blanking.
- (1) Note. Blanking is defined as separating a product from within the confines of the work so that not more than one of the edges of the product is an edge of the workpiece, or so that less than 1/2 of the circumference of a curved product is a part of the circumference of initially curved work. Mere serration does not in itself comprise more than “one edge” of the workpiece.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
40+, for the combination of blanking and cutting steps.
49, for process of progressive slotting which comprises a series of blanking operations.
50, for process of repetitive blanking.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclasses 577+ for metallic blanks not elsewhere provided for.

- 56** This subclass is indented under subclass 13. Process which includes a step of making a continuous cut which extends through the work thickness wise and which proceeds in a direction toward or from one edge of the work, which may be a leading or trailing edge.

(1) Note. Included are processes of “drawcutting” and “slitting”.

SEE OR SEARCH THIS CLASS, SUBCLASS:

44+, for process of progressively cutting longitudinally of the work combined with transverse severing from the leading edge of the work.
 49, for process of making a progressive cut by a plurality of cutting steps.
 52, for process of progressive cutting effected in increments during a single cutting step.
 341+, for progressive transverse “flying” cutter.
 425+, for means to move work past a fixed-type slitting cutter.
 483+, for means to carry a rotatable disc-type tool across work.
 611, for a progressively cutting oscillating cutter.
 614, and 636, for a progressively cutting reciprocating cutter.
 642+, for “draw-cut” mechanism.
 689, for a progressively cutting punch.

SEE OR SEARCH CLASS:

225, Severing by Tearing or Breaking, subclass 3 for process of breaking or tearing longitudinally of the direction of work-feed.

- 57** This subclass is indented under the class definition. Device which comprises means, actuable by force applied by and at the will of an operative, to override the normal cyclic functioning of a part(s) of the device, which part(s) returns to normal functioning when the application of the intervening force ceases.

(1) Note. The disturbance referred to is temporary and exists only during the application of force by an operative. (Example: A machine, set to cut products of a given size, is controlled by a pushbutton to cut small pieces for sampling purposes).

(2) Note. The disturbance herein contemplated does not embrace stopping. For disclosures, of noncyclic stopping means, see subclasses 58+; and, for cyclic stopping means, see other appropriate subclasses whose titles include the work “stopping” or equivalent term (e.g., subclasses 202+).

(3) Note. Adjustment of a device establishes a new condition which persists indefinitely, and is thus distinguishable from a “disturbance” which permits the disturbed part to return to the previous condition upon withdrawal of the intervening force.

SEE OR SEARCH THIS CLASS, SUBCLASS:

68, for manually caused stopping of a machine or a part thereof.
 232+, for tool actuating means adapted to be struck by a mechanical part, which means might be urged manually to cause tool operation at will.
 252, for supplemental manual work-feed means.

- 58** This subclass is indented under the class definition. Device provided with means capable of bringing any or all of the moving parts of the device to a halt, such means acting to accomplish its halting effect in response to a signal or impulse which cannot be predicted to occur during any particular one of a number of recurring cycles of operation (either of the machine as a whole, of the tool, or of any part of the machine which has a cyclic law of operation).

(1) Note. Such means may comprise, for example, a device effective to disrupt the flow of power to a part or all of the machine, as by effecting the disconnection of the parts of a clutch.

- (2) Note. It is not a bar to original placement of a patent in this subclass, that the claimed power train disrupting, braking or other “stopping” means may be activated at a time when the part to be halted is, purely adventitiously, at a standstill due to its normal cyclic operation.
- (3) Note. If, however, the normal and intended operation of power disrupting, friction gripping, or other motion preventing means, is to forestall the impending start of movement or activation of a part of the device, then the motion preventing means is regarded as an interlock and its claimed combination with an instrumentality of a cutting machine is found in subclasses 399+, below.
- (4) Note. If the normal and intended operation of power disrupting means is to forestall or prevent future movement of a tool or tool support by disrupting its power-transmitting connection to an uninterruptedly moving tool-actuating mechanism, the claimed combination of the power-disrupting means with the tool support and tool actuating mechanism is found in subclasses 572+, indented under subclass 571 in this schedule.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 57, for manually caused disturbance (i.e., temporary change) of cyclic operation.
- 69, for stopping means effective on completion of a predetermined number of cutting cycles.
- 70, for delayed stopping after cessation of cyclic operation.
- 571+, for devices which disables a tool without bringing to a halt any moving part other than the tool or its support; see (4) Note above.
- SEE OR SEARCH CLASS:
- 72, Metal Deforming, subclasses 1+, for a stopping feature in a metal-deforming machine.
- 100, Presses, subclasses 341 through 352 for a press having a safety control.
- 192, Clutches and Power-Stop Control, appropriate subclasses, for stopping means in general; and subclass 134 for a device applicable to a punch press which is peculiarly designed to stop machine operation in response to detection of the unauthorized presence of a part of an operative's body.
- 234, Selective Cutting (e.g., Punching), subclasses 30+ for a selective cutting device provided with randomly actuated stopping means.
- 59 This subclass is indented under subclass 58. Device provided with means which may be actuated manually to thereby cause at least a portion of the device to go through its normal cyclic motions after the stopping has been effectuated.
- 60 This subclass is indented under subclass 58. Device provided with means whereby the signal or impulse also brings into action means to bring the work into cutting engagement with another cutter or to cause such other cutter to engage and cut the work.
- 61 This subclass is indented under subclass 58. Device wherein the signal or impulse is generated by a detector* for either (a) a product of the cutting operation, or (b) means to accomplish direct, or otherwise affect movement of such product.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 73, for means to otherwise control a machine by monitoring a product.
- 78+, for a product handling feature in a cutting machine environment.
- 358+, for the control of an operation by means responsive to product.
- SEE OR SEARCH CLASS:
- 198, Conveyors: Power-Driven, appropriate subclasses for different types of conveyors or systems of plural conveyors having operation control means responsive to a condition of a conveyor or to a condition of the conveyed load.

- 62** This subclass is indented under subclass 58. Device in which the signal or impulse is generated by a detector* which directly or indirectly senses a condition or location of the tool or of the work-moving means.
- (1) Note. The direct contact of the detector with the tool or work-moving means may be that which occurs in the normal, uninterrupted operation of the device, in which case the signal for stopping is generated by failure of the detector to make such direct contact.
- 62.1** This subclass is indented under subclass 62. Device in which the detector* senses a condition or a location of the tool*.
- (1) Note. Included in this subclass are broken tool alarms and safety devices.
- 63** This subclass is indented under subclass 58. Device in which the signal or impulse is generated by a detector* for the work.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 80, for product handling means initiated by means responsive to work.
- 209+, 211+, 286+, for operation controlled by means responsive to work in cyclically operated cutting machines.
- 360+, for operation controlled by means responsive to work, in cutting machines in general.
- SEE OR SEARCH CLASS:
- 226, Advancing Material of Indeterminate Length, subclass 43 for material responsive control means for stopping the operation of feeding means.
- 64** This subclass is indented under subclass 63. Device in which the detector contacts a portion of the work moving in a bent or arcuate path.
- 65** This subclass is indented under subclass 64. Device in which a portion of the work normally moves in a predetermined bent or arcuate path, or in any one of a number of possible bent or arcuate paths in a zone whose limits are defined by two such paths, and the signal is generated upon departure of the work from the predetermined path or zone.
- 66** This subclass is indented under subclass 63. Device in which the detector is under the influence of gravity or any other force which tends to keep it constantly in contact with the work.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 64+, for a device in which the detector is supported on or urged into contact with buckled work.
- 360+, for specific types of work responsive means; and see the Notes thereto.
- 67** This subclass is indented under subclass 66. Device in which the detector is elastically urged into contact with the work.
- 68** This subclass is indented under subclass 58. Device wherein the impulse or signal which brings about or initiates the stoppage is entirely a product of the will of an operative.
- (1) Note. This subclass excludes means for halting a machine part solely by the application of braking force, or the interposition of blocking means, in a yieldable drive train. Examples of such excluded subject matter may be found in the patents of subclass 593.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 57, for manually actuated device which disturbs cyclic operation, rather than starts or stop a cyclic cutting operation.
- 571, for disconnecting means between tool and tool actuator, as for changing a machine set-up, and subclasses 572+, indented thereunder, for means capable of connecting or disconnecting a tool, or tool and its support, to or from an actuating element while the latter is in motion (i.e., "gag" or "gag block"), and see (4) Note under subclass 58, above.
- 69** This subclass is indented under the class definition. Device including means to bring one or more parts to a halt after a tool has carried out a

fixed (but not necessarily unalterable) plurality of tool cycles*.

- (1) Note. Where the part stopped is a cutter, the tool cycle of reference is the cycle of such cutter itself, not that of another cutter operating on a different cycle.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 61, for a device which includes means for stopping upon completion of formation of a stack of products of predetermined size.
- 203+, for a cutting machine in which the operative relationship between the work-feed means and tool actuating means thereof is interrupted, once for every cutting cycle, by the stoppage of a part or parts, so that the intervention of human will is necessary to restore such interrelationship and bring about another cutting cycle.
- 524+, for unicyclic cutting machines (other than subclass-203 type).

SEE OR SEARCH CLASS:

- 234, Selective Cutting (e.g., Punching), subclass 21 for means to stop a selective cutting machine after a given number of operations.

70 This subclass is indented under the class definition. Device which includes means effective to bring a part or all of the device to a halt upon the lapse of a certain limited period of time subsequent to the termination of feeding and cutting operations.

- (1) Note. Examples are the tape "run-out" devices on message-handling tape punches.

SEE OR SEARCH CLASS:

- 234, Selective Cutting (e.g., Punching), subclasses 59+ for a pattern-controlled selective cutting machine.

72 This subclass is indented under the class definition. Apparatus, each of whose parts has a desired operating condition according to a law of operation; such apparatus being provided with a detector for sensing a deviation of a part(s) (or all of the apparatus) from its or their

desired operating condition; and including means to modify - in response to a signal or impulse transmitted by said detector - (a) the cyclical operation of such part(s) (or the entire apparatus) to correct the deviated operating condition; and/or, (b) the normal cyclical operation of another part(s) to compensate for the deviated condition; whereby, in either event, the maintenance of a normal cyclical desired operating condition of the apparatus as a whole is achieved.

- (1) Note. The sensing or detecting may be direct; i.e., by determining the operation of a component of the device (as, for example, in U.S. Patent No. 2,175,828, wherein a driven feed roller is coupled to a roller-speed detector); or may be indirect, i.e., by determining the result of the operation of a component of the device (as, for example, in U.S. Patent No. 1,961,538, wherein work is moved by feed rollers, indicia on the work are scanned stroboscopically to detect any variations in work speed imparted by the feed rollers, and such speed variations are eliminated by correcting the feed roller speed).

- (2) Note. Merely stopping or starting a cyclic component of the device to effect the functioning thereof is not considered to be modifying the operation of a component. However, a regulating means, which accomplishes such modification of a cyclic operation, may itself be started or stopped (to effect the cyclic operation), in response to the detection of a deviation in the desired condition. (See, for example, U.S. Patent No. 2,023,243, wherein the leading edge of the work initiates the actuation of a regulating means, which means compares the position and speed of the entering work relative to the angular position and speed of a flying cutter and modifies the angular position of the cutter to compensate for the entrance timing of the work).

- (3) Note. The imposition of a change upon a component by an operator (e.g., physical relocation of a component) is not considered a deviation within the meaning of the definition above. Thus, patents

claiming means for detecting operator-imposed changes, and means to vary the operation of the device in response to detection of such changes, will be found in other subclasses; e.g., subclasses 399+, below.

- (4) Note. Detection of an irregularity in the work, which irregularity is not the result of a deviation in the desired operation, but is a part of the work, is not considered a deviation detection within the meaning of the definition above. Thus, devices claiming means to detect such irregularities and means to vary the operation of a cutting device in response to the detecting means, will be found in other subclasses; e.g., subclasses 360+, below.
- (5) Note. For Search Note relating to other Control Functions, see the Notes in subclass 399, below.

SEE OR SEARCH CLASS:

226, Advancing Material of Indeterminate Length, subclasses 10+ for means to sense material and control the operation of material feeding means.

73 This subclass is indented under subclass 72. Device in which a deviation in the operating condition of the device is indicated indirectly by the means to detect or sense the product.

74 This subclass is indented under subclass 72. Device in which the means to vary the cyclic operation effects a revision in the operating condition of the component whose deviation is detected or sensed.

75 This subclass is indented under subclass 74. Device in which the means to vary the cyclic operation also effects a revision in the operating condition of a component different from the component whose deviation is detected or sensed.

75.5 Optimizing product from unique workpiece: This subclass is indented under subclass 74. Device including means to compare the work, the desired product and the stored data to better utilize that particular piece of work to produce more or better product.

76 This subclass is indented under subclass 72. Device in which the detecting means senses the speed or position of the work and in which the means to vary the cyclic operation effects a revision in the speed of a cutting tool in response to the detected speed or position of the work.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, appropriate subclasses for different types of conveyors or systems of plural conveyors having operation control means responsive to a condition of a conveyor or to a condition of the conveyed load.

76.1 WITH CONTROL MEANS RESPONSIVE TO REPLACEABLE OR SELECTABLE INFORMATION PROGRAM:

This subclass is indented under the class definition. Device provided with memory means, i.e., a member in which digital or analog data can be impressed for subsequent recall, and including means to detect the data on the memory means and accordingly regulate the operation of the device.

- (1) Note. The “memory” means of this subclass may comprise permanently installed structure of the device or it may comprise a removable tape or card.
- (2) Note. A templet, per se, is not considered to be a replaceable information supply; however, a device including a templet from which information is retrieved and stored in the device is included in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

399, for a cutting machine with a portion thereof controlled by a remote member and see the Search Notes thereunder for a comprehensive listing of subclasses in this class including “control” features.

565, for a cutting machine of this class type including means to drive or guide the tool with a templet surface following tool.

- SEE OR SEARCH CLASS:
 72, Metal Deforming, subclass 7 for analogous “pattern” sensing means which controls a metal deforming device.
 234, Selective Cutting (e.g., Punching), subclasses 59+ for a pattern controlled selective cutting machine.
- 76.2 For cutting component of animal; e.g., hair clipper:**
 This subclass is indented under subclass 76.1. Device particularly adapted to severing a portion of an animal, either living or dead.
- (1) Note. Included herein is a hair clipping (or wool shearing) machine on which an animal is placed, having a control means responsive to replaceable or selectable information program which guides the cutter.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 13+, for the method of cutting hair, or for the method of shearing a sheep.
- SEE OR SEARCH CLASS:
 30, Cutlery, subclasses 196+ for randomly manipulated hair clippers, generally.
- 76.3 Removable element carries program:**
 This subclass is indented under subclass 76.1. Device wherein the member on which the replaceable data is impressed is physically detachable from the device.
- 76.4 Indeterminate length, web or strand:**
 This subclass is indented under subclass 76.3. Device wherein the removable member on which replaceable data is stored is generally elongated and wherein the device either engages no end of the removable member or engages only the leading or trailing end thereof.
- (1) Note. The replaceable member may be endless, or it may be wound on a spool.
- 76.5 Magnetic:**
 This subclass is indented under subclass 76.4. Device wherein the magnetic characteristics of the removable member are utilized in storing data thereon.
- 76.6 Arithmetically determined program:**
 This subclass is indented under subclass 76.1. Device wherein the memory means can be impressed for subsequent recall only by digital data.
- 76.7 With condition sensor:**
 This subclass is indented under subclass 76.6. Device including means to detect a characteristic other than that of the “memory”.
- (1) Note. The condition sensor of this subclass may respond to work, product, a component of the device, or to the environment.
- 76.8 Responsive to work:**
 This subclass is indented under subclass 76.7. Device including means to detect the material to be cut before the cutting action takes place.
- 76.9 With operator input means:**
 This subclass is indented under subclass 76.6. Device also having means to alter the operation thereof (without changing the program) at the control of the person operating the device.
- 77** This subclass is indented under the class definition. Device having means to determine the weight of a piece or portion of the cut product.
- SEE OR SEARCH CLASS:
 177, Weighing Scales, appropriate subclasses for the combination of a cutting machine and a weighing scale which received material cut or to be cut by the cutting machine, characterized by means for actuating, or modifying the operation of, the cutting machine in response to determination of the weight of material accumulated on the weighing scale; and subclasses 60+ for weigh chamber responsive material control.
 198, Conveyors: Power-Driven, subclasses 504+ for a conveyor having load weighing means.

78 This subclass is indented under the class definition. Apparatus including means to move, guide, or otherwise affect the motion of, the product of a cutting operation - other than by the mere provision of a receptacle or support into or onto which product may descend at random (i.e., without necessarily assuming any regular arrangement).

- (1) Note. A cutting machine including such receptacle or support for receiving product in random arrangement constitutes subject matter of subclass 167, below.
- (2) Note. The handling given recognition by this and indented subclasses is additional to that which inherently is accomplished by the tool(s) in the cutting operation. A tool, qua tool, is therefore not to be considered a product handling means. But a specific element fixed to, or a portion integral with, a tool will be recognized as a product handling means if there is a clear teaching, in the disclosure of the device, that the element or portion performs a product handling function.
- (3) Note. Inasmuch as many work moving means of the cutting arts also function to carry away the product of the cutting operation, a patent whose only claimed means capable of product handling is a device for moving, guiding, supporting, or stopping motion of, work will not be placed originally in this subclass unless such work handling device is claimed in terms of its specific product handling function. (Of course, a patent claiming work handling means in combination with additional means to give the work handling means a product handling effect - such as means to tilt a work table to effect product sliding - will be placed originally in this or an indented subclass).
- (4) Note. For the purpose of original placement in this classification, a means to handle the product of one of a claimed series of tool stations, while proceeding from such one station to a succeeding station, will be considered a work handling means for the succeeding station

rather than a product handling means for the earlier station. (Disclosures of such means may be placed as cross-reference copies in this or indented subclasses, where deemed pertinent).

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 23+, for method of cutting and subsequently handling the product.
- 77, for a device under the class definition combined with means to weigh the cut product.
- 167, for a device under the class definition combined with a receptacle or support for the cut product; and see (1) Note, above.
- 404+, for a device including means to move work between successive tool stations.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, subclass 339.1 for a conveyor arranged to facilitate working on the conveyed load at a work station, and subclasses 373+ for a conveyor having means for changing the attitude of the conveyed load relative to the conveying direction.
- 242, Winding, Tensioning, or Guiding, subclasses 487.1+ and particularly subclasses 522+ and 911 for cutting a product which is subsequently wound classified along this line: Patents which claim a device for cutting material and for winding are placed in Class 242 whereas patents which claim a device for cutting material supplied from a wound source, or in which disclosed structure for winding a cut product is not significantly claimed are placed in Class 83 or related Class 225 (Severing by Tearing or Breaking).
- 271, Sheet Feeding or Delivering, subclasses 278+ for a device for removing individual sheets to some determined position (where no means to treat the sheet is claimed specifically).
- 414, Material or Article Handling, appropriate subclasses, for an instrument or mechanism for placing or displacing articles in a particular manner, as in

- stacks or piles; also for a carrier or forwarding mechanism of general type combined with special means for placing the load on the carrier or removing it therefrom (where no means to treat the material is claimed specifically).
- 79** This subclass is indented under subclass 78. Device including a detector* for sensing product or work, a transmitter*, and means to effect or initiate product handling or delivery as a direct or indirect result of the receipt by said means of a detected and transmitted signal or impulse.
- (1) Note. As between Classes 83 and 209, patents claiming significant assorting of the work for, or the product of, a disclosed cutting device will be placed as an original copy in Class 209 unless the cutting device also is claimed significantly, in which latter case the original copy will be placed in this class (class 83).
- (2) Note. Included in this subclass are patents disclosing the sensing of product and the initiation of product handling responsive thereto, whereas subclass 80 (indented hereunder) is the repository for patents disclosing product handling responsive to work sensing.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
360+, for means to initiate an operation, other than product handling, controlled by product sensing or work-sensing means.
- SEE OR SEARCH CLASS:
198, Conveyors: Power-Driven, appropriate subclasses for different types of conveyors or systems of plural conveyors having operation control means responsive to a condition of a conveyor or to a condition of the conveyed load.
- 80** This subclass is indented under subclass 79. Device in which the detector senses work.
- 81** This subclass is indented under subclass 78. Device including a detector* for sensing the presence of a moving tool, or of an element partaking of all tool motions, at a predetermined point in the path of motion of said tool or element; and including a transmitter* and means to effect or initiate product handling or delivery as a direct or indirect result of the receipt by said means of a detected and transmitted signal or impulse.
- 82** This subclass is indented under subclass 81. Device in which the detector acts to sense the retraction of the tool from the work.
- 83** This subclass is indented under subclass 78. Device which comprises, as part at least of the product handling means, or is additionally provided with, means adapted to receive and support the cut product with the ends of the product depending downwardly on opposite sides of the support means.
- 84** This subclass is indented under subclass 78. Device which includes structure for placing or retaining product pieces in some regular order relative to, and in contact with, one another.
- (1) Note. Included in this group of subclasses are patents which disclose that elongated product pieces are arranged in substantial parallelism or that flat product pieces are arranged sequentially in face-to-face contact.
- (2) Note. As indicated by the subclass definition, a patent claiming a receptacle or support which is disclosed as serving to receive and retain the product pieces in an orderly arrangement will be included in this group of subclasses. However, where there is no teaching that the product pieces are placed or held in the receptacle or on the support in some regular order the patent will be placed in subclass 167, below.
- SEE OR SEARCH CLASS:
414, Material or Article Handling, subclasses 6+ for a device adapted to arrange articles in special relation to each other in a pile or stack.

85 This subclass is indented under subclass 84. Device which has means to place together, or retain, a plurality of similar nonplanar cut pieces in sequential interfitting order, with at least a portion of one piece located within, and in contact with, a mating hollow portion of the next adjacent piece.

86 This subclass is indented under subclass 84. Device which has means to place together, or to receive and retain, a multiplicity of substantially planar-faced cut pieces in sequential face-contacting relation, supported one on another or edgewise on a common base.

(1) Note. A stack or pack is formed by superposition or juxtaposition of the pieces thicknesswise. Herein, and in the indented subclasses, the term "stack" will be used to designate the concepts generally included in both the terms "stack" and "pack".

(2) Note. Such stack need not be static but may be in motion, such as one which is continually diminished at one end and replenished at the other end.

(3) Note. A patent disclosing a device which includes a mere product-conforming cavity in a hollow tool or in the tool and its support, though it inherently holds the pieces in stack formation, is not included in this group of subclasses (86+) but is placed on the basis of other features. However, a stack holding means which communicates with such tool or its support, or which is incorporated as an added element within the tool or its support, its proper subject matter for this group.

SEE OR SEARCH THIS CLASS, SUBCLASS:

164, for a hollow tool having a product diverting conduit within it or extending therefrom which does not include a stack holding means within the definition of subclass 86.

SEE OR SEARCH CLASS:

271, Sheet Feeding or Delivering, subclasses 207+ for a sheet delivery device having means for receiving and retaining the sheets in stacked or packed relation.

87 This subclass is indented under subclass 86. Device including means to support product pieces, individually or in stacks, in spaced relationship in substantially parallel planes so that an edge of one such piece or stack is above the adjacent edge of the next or adjacent piece or stack, and including stacking means which moves along the support means for engaging the pieces or stacks sequentially and moving them into superposed stacked relation with each other.

88 This subclass is indented under subclass 86. Device including means to arrange a series of cut pieces on a product-moving support so that each piece of the series rests partly in contact with the support and partly on an adjacent piece.

(1) Note. Included in this subclass are patents disclosing apparatus as above defined and further including means to place additional cut pieces on the overlapped series.

89 This subclass is indented under subclass 86. Device including means to move one or more product pieces from a stack, or to cause product pieces to proceed, or be directed to, a stack, and other product pieces to proceed or be guided in another direction (as, for instance, but not necessarily, to another stack).

SEE OR SEARCH THIS CLASS, SUBCLASS:

102+, for a device under the class definition which includes means to divert one portion of product from another, but without means to stack the product pieces.

90 This subclass is indented under subclass 86. Device which is effective in itself to move, or is provided with additional means for moving, a formed stack of product pieces as a unit.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 89, for a device including means to move a portion of a stack of product pieces from the stack.
- 91** This subclass is indented under subclass 90. Device in which the bodily movement of the stack is accomplished by moving the support on which the pieces are received to form the stack.
- 92** This subclass is indented under subclass 91. Device in which means is provided to move the support progressively broadside away from the source of product pieces as product pieces are added to the stack.
- (1) Note. A typical device of this kind operates to keep the product receiving end of the stack at all times in the same position with respect to the source of pieces for the stack.
- 92.1** This subclass is indented under subclass 92. Device including means to vary the progressive broadside movement of the product, which means is operatively linked to the mechanism which adjusts the extent that a work-feeding device moves between each cutting cycle.
- (1) Note. Included in this subclass are devices having means to vary the thickness of product pieces being cut, which means effects the adjustment of the movement of the product holder to compensate for such variance in thickness.
- 93** This subclass is indented under subclass 86. Device which includes means to oppose broadside movement of the stick away from the source of product pieces as product pieces are added to the stack.
- (1) Note. Devices including a receptacle telescoped over a stack holder or guide in which the receptacle is moved by the growing stack are typical of the art of this subclass.
- 94** This subclass is indented under subclass 86. Device including means to move or guide cut product pieces singly to a means for supporting a plurality of the pieces in stacked relation.
- 95** This subclass is indented under subclass 94. Device in which the stack holder is provided with a rod-like projection which is introduced into an aperture in each product piece so as to hold the pieces in stacked relation, the aperture being either preformed or formed by the projection upon placement of the piece thereon.
- SEE OR SEARCH CLASS:
 402, Binder Device Releasably Engaging Aperture or Notch of Sheet, subclass 1, for a sheet binder device of that class which includes in combination, an impaling type sheet retainer and a discrete sheet aperture forming device, which device perforates a sheet prior to placing the same on the retainer; subclass 7 for such device including an impaling type sheet retainer which penetrates and inserts a pliant strand through a sheet surface, and subclass 25, for a sheet binder device including an impaling type sheet retainer including means to force a sheet upon the sheet retainer.
- 414, Material or Article Handling, subclasses 1+ for a device having a projection engaged in the apertures of a series of articles for holding the articles in stacked relation.
- 96** This subclass is indented under subclass 94. Device which functions to engage a piece of cut work on its surface of greatest area and move it in a direction perpendicular to that surface into face-contacting relation with a previously cut piece.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 97+, for means to hold a stack of product pieces which may be discharged broadside from within a hollow cutter but not by means to deliver individual pieces.

SEE OR SEARCH CLASS:

271, Sheet Feeding or Delivering, subclass 83 for oscillatory fly means to deliver a sheet to a stack.

97 This subclass is indented under subclass 86. Device in which the stack is formed by means which receives pieces, formed by a tool having a cavity or aperture and a continuous cutting edge bounding the open end of said cavity or aperture, after the pieces have left the confines of the tool.

(1) Note. The stack former may be claimed in some general term such as "a chute"; but if, as disclosed, it actually forms a stack, a patent therefor is placed here regardless of the breadth commonly assigned to the name applied to such stack former.

(2) Note. For the distinction between this subclass and subclass 164, below, see (3) Note under the definition of subclass 86 above.

98 This subclass is indented under subclass 78. Device which effects movement of product directly by means of one or more jets or streams of liquid or gaseous material.

(1) Note. The pressure of the fluid current may be superatmospheric or subatmospheric.

(2) Note. Fluid pressure means (blast or vacuum) which function merely to push or pull product into contact with a mechanical product-moving or product-braking means do not constitute subject matter for this subclass. Original patents claiming such fluid blast devices will be placed in the subclass based on the nature either of the mechanical product-moving means or the mechanical product-braking means.

(3) Note. The Notes under the definition of subclass 402, below, include a comprehensive listing of subclasses in this class and in other classes which deal with material handling by fluid current.

SEE OR SEARCH THIS CLASS, SUBCLASS:

152, for a product-moving means with suction means for pressing product to the moving means.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclass 428, 438, and 493 for a power-driven conveyor combined with means for impinging fluid on the conveyed load.
226, Advancing Material of Indeterminate Length, subclasses 97.1+ for means to advance material by fluid current.

99 This subclass is indented under subclass 98. Device comprising a number of fluid jets each of which impinges upon a separate, independent, unitary part of the product resulting from the completion of one cutting cycle.

100 This subclass is indented under subclass 98. Device including means to produce a zone of subatmospheric pressure so related spatially to the cutting zone or product path that the product will move under the influence of atmospheric pressure toward or through said zone of subatmospheric pressure.

(1) Note. See (2) Note and the search subclass note under the definition of subclass 98 above.

101 This subclass is indented under subclass 78. Device in which movement of the product is effected by frictional engagement with bristles mounted on a backing having relative motion with respect to the product.

102 This subclass is indented under subclass 78. Device including means for accomplishing one of the following functions:

- (a) causing contiguous (either touching or adjacent) products which have been traveling along parallel paths to now travel in diverging directions; or preventing their paths from merging or overlapping;
- (b) causing, or permitting, product pieces which have been proceeding seriatim along a common path to now follow

respective discrete and individual paths;

(c) (c) causing, or permitting, one or more product pieces to follow a path away from the zone of separation while restraining one or more pieces from proceeding away from the zone of separation (i.e., holding one piece back while another moves away);

(d) (d) dividing a moving group of products into smaller groups (or units) traveling in the same direction of general path as that before division; or

(e) (e) positively moving products from the zone of separation in different directions.

- (1) Note. Such separation must be additional to that inherently accomplished by the tool(s) in the act of cutting.
- (2) Note. The removal (or facilitation of removal) of one product portion from the as-cut position, while leaving the portion from which it has been cut in the cutting zone to serve as work for a succeeding cut by the same tool, is not considered to be separation.
- (3) Note. The separation signaled by this subclass is distinct from that brought about by means for moving a product from contacting engagement with a tool (such as stripping or ejecting means). So, the movement of product out of contact with a tool, even though it may involve a motion away from another product portion, is not considered a separation for the purpose of patent placement in this and indented subclasses.
- (4) Note. On the other hand, a product portion which has been subjected to the action of a stripper- or ejector-type means (as defined in subclass 111) is not considered (for the purpose of this classification) to be closely adjacent to other product portions from which the stripper or ejector has moved it apart, so that a further movement of the portions in different directions will not be deemed to

be a separation. (A positive teaching that a stripper or ejector places a product portion in actual contact with another portion, however, will not be ignored). For patents claiming means to strip or eject a product portion and thereafter convey it away, see subclass 112.

- (5) Note. The combination with cutting, of separation accomplished in response to a sensing of a physical characteristic of the pieces to be separated (such as quality separation), is provided for in subclass 79.
- (6) Note. Merely allowing pieces to fall freely from a common height or place of departure is not considered to permit them to travel in substantially different directions. But diverting guides which cause certain of the so dropped pieces to travel in one path and others to follow a different path constitute separating means.
- (7) Note. Since this subclass is specific to that of produce, (i.e., cut work) handling, which requires the operation of motion-affecting means additional to the work-feeding means, at least one of the separated product portions must be directed to its destination by means other than the work moving means.
- (8) Note. Although separation inherent in a cutting operation (e.g., the removal of certain product pieces through a hollow cutter) is not sufficient to place here a patent disclosing such, a patent directed to product separating means carried by a cutter is proper for this and indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 27, for a method of cutting including a step of product separation.
- 79+, for means to separate product portions responsive to detection of a product characteristic; and see (5) Note above.
- 89, for a cutter combined with means to divide a stack of pieces resulting from the cutting operation.

- 98+, for product separating means employing a fluid current.
- 101, for product separating means including a product-engaging brush.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, subclasses 348+ for a system of plural conveyors having selectable plural sources or destinations for the conveyed load, subclasses 418+ for a system of plural conveyors having means for establishing and moving a group of items, and subclasses 434+ for a system of plural conveyors having means for arranging or rearranging a stream, or streams, of items.
- 209, Classifying, Separating, and Assorting Solids, appropriate subclasses, for a product separating means, per se; and see (1) Note to subclass 79 above.

102.1 This subclass is indented under subclass 102. Device in which a kerf* entering means engages the contiguous sides of the work to prevent their paths from merging or overlapping.

103 This subclass is indented under subclass 102. Device wherein means are provided to dislodge a severed product from the surrounding material from which it has been cut but with which it is still in contact; or to dislodge from such material a severed product which has been cut, removed, and reinserted into its original position.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 108, for means to reinsert product in base material after severance therefrom.

104 This subclass is indented under subclass 102. Device in which means are provided to permit the earth's gravitational field to act selectively on a plurality of product portions; with the result that one portion or piece will move along a path have a downward component, under the gravitational impetus, while another portion or piece will move along some other path or will be restrained from moving away from the zone of separation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 157, for means for tilting or withdrawing a product support so that the product is left without support against gravity, such means not having a product separating function.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, subclass 311, 359+, and 523+ for a power-driven conveyor combined with a gravity conveyor.
- 209, Classifying, Separating, and Assorting Solids, appropriate subclasses, for a gravity type separator, per se.

105 This subclass is indented under subclass 102. Device provided with passive means for guiding a product into a path diverging from that followed by another product.

(1) Note. The deflecting guide of this subclass is effective to direct a moving product portion into a desired path, not to hold it from further movement. Stationary means (catchers) which prevent a product portion from moving, while another portion continues in motion, will be found in subclass 102 and in subclass 104 indented thereunder.

(2) Note. The divergence effected by a guide of this type may be either simultaneous with the passage of another product portion through the zone of separation or may be temporarily spaced therefrom. That is, the guide may operate on one or more product portions traveling along parallel paths or moving seriatim along the same path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 102, for means to hold back one product portion positively while another portion proceeds to travel past the area of such holding back, and indented subclass 104 for such means wherein the product portion not held back escapes from the zone of separation under the impetus of gravity; and see (1) Note, above.

- 373, for a work guide whose positioning movement is synchronized with tool actuation.
- 438+, for a guide for directing the travel of moving work, rather than product.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, sub-classes 351+, 367, 442, 525+, 599, and 633+ for passive means for guiding a load from one conveying path to another conveying path diverging therefrom.

- 106** This subclass is indented under subclass 105. Device, provided with passive means for guiding a product portion into any one of a number of different paths, which means may be reoriented (either at will or cyclically) with respect to oncoming product so as to effect such selective guidance.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 104, for a gravity type product separator, including a tiltable or with drawable product support which functions to separate product portions.
- 157, for a product deflecting means in the form of a tiltable or with drawable support for the product, which means does not have a separating function.

- 107** This subclass is indented under subclass 102. Device which includes plural dynamic product moving means which function to effect separation by directly and positively moving one product from the zone of separation in a direction or path different from that in which another product is directly and positively moved.

- (1) Note. One of the product moving means may be a work moving means, which may be claimed as such.
- (2) Note. Means which move a product portion out of contact with a tool (e.g., stripper or ejector) are not considered product moving means for the purpose of this subclass, in accordance with (3) Note to subclass 102.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, sub-classes 370.07 through 370.09, 370.1, 370.11 through 370.13, 426+, 432, 433, 434+, 597+, and 601 for power-driven conveyor means for moving a load from one conveying path to another conveying path diverging therefrom.

- 108** This subclass is indented under subclass 78. Device wherein means is provided to re-engage the product piece with the surrounding material, from which it was severed, by inserting the piece into the aperture formed when the piece was produced.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 25, for a corresponding method.
- 103, for means to remove such reinserted piece from the base material.

- 109** This subclass is indented under subclass 78. Device having active means to propel the product or passive means in the form of a guide* to define, limit or change (without terminating) the path of moving product; or means which allows or facilitates motion of unsupported product; or means, other than the cutter or work-feed means, to cause relative motion between the product and a member of the cutting pair.

- (1) Note. A mere support for product is not a guide.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 78, for a brake or abutment stop for product.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, appropriate subclasses for a power-driven conveyor or for such a conveyor combined with a gravity conveyor.

- 110** This subclass is indented under subclass 109. Device including means to move the product away from the cutting zone at a speed which is greater or less than the speed of the work as it moves toward the cutting zone.

- (1) Note. For a device which includes a brake or abutment for stopping the product completely, see subclass 78, above.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
78+, and see (1) Note above.
- SEE OR SEARCH CLASS:
198, Conveyors: Power-Driven, subclasses 460.1+ and 579 for a conveyor feeding the conveyed load to another conveyor having a greater conveying speed.
- 111** This subclass is indented under subclass 109. Device, provided with means for causing or assuring relative motion between a product piece or portion and a cutter which has produced for penetrated it so as to remove from contact with such cutter a product piece or portion which tends to cling thereto.
- (1) Note. A device of this type may be termed a “stripper” or “ejector”.
- SEE OR SEARCH CLASS:
72, Metal Deforming, subclass 257, 328, 344+, and 427 for a press-type metal deforming device including a means to eject or strip a product from a forming die.
- 112** This subclass is indented under subclass 111. Device in which the means for removing the product from the cutter delivers the product to means for thereafter transporting such product away from the first product moving means, or to means for supporting the cut product as it continues to move under the influence of gravity.
- 113** This subclass is indented under subclass 111. Device which cooperates with a tool having a cutting edge located on the outer or arcuate periphery of a circular disc or cylinder turning unidirectionally about an internal axis.
- 114** This subclass is indented under subclass 113. Device which encompasses a substantial portion of the rotary tool axis and periphery.
- 115** This subclass is indented under subclass 113. Device in which the relative-motion-producing means is physically attached to, or otherwise supported by, the stripped tool or cooperating revolving tool.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
136+, for a stripper mounted on a moving tool (other than rotary) or tool support; and see the Notes thereto.
- 116** This subclass is indented under subclass 115. Device which is effective to produce the relative motion in a radial direction, from or towards the axis of rotation of the rotating tool.
- 117** This subclass is indented under subclass 116. Device including elastic or springlike means deformable to urge or move the relative-motion-producing means from one position to another.
- (1) Note. Springlike means may function to move a “stripper” or “ejector” to its normal position after movement to its operative position by a cam means, etc.
- (2) Note. A typical device of this type is a coil spring, which may directly contact the product or urge another device which directly contacts the product.
- 118** This subclass is indented under subclass 113. Device including elastic or springlike means deformable to urge or move the relative-motion-producing means from one position to another.
- (1) Note. The springlike means may be integral with the stripping or ejecting means.
- 119** This subclass is indented under subclass 113. Device including relative-motion-producing means which is mounted to permit limited oscillatory movement thereof about an axis while it is exerting force on the product.
- 120** This subclass is indented under subclass 119. Device including means which functions to move product relative to at least one of two cooperating tools which revolve about spaced parallel axes.

- 121** This subclass is indented under subclass 113. Device including a relative-motion-producing means located in a fixed position relative to immovable parts of the machine.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
145, and 146, for a stationary stripper in combination with an oscillating or reciprocating tool.
- 122** This subclass is indented under subclass 121. Device including means which functions to move product relative to at least one of two cooperating tools which revolve about spaced parallel axes.
- 123** This subclass is indented under subclass 111. Device wherein the product lies within, and in contact with the walls of, a cavity in a tool which has produced it, said tool having a continuous cutting edge bounding said cavity, and in which the relative-motion-producing means removes the product from the cavity.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
97+, for means to form a pack or stack of cut pieces delivered from a hollow cutter.
98+, for means to accomplish ejection from a hollow cutter by fluid blast or suction.
116+, for a device of this type mounted on a rotary tool support.
- SEE OR SEARCH CLASS:
72, Metal Deforming, subclasses 344+ for means to eject a formed article from a female die.
408, Cutting by Use of Rotating Axially Moving Tool, subclass 68, for a hollow drill combined with means to eject the product therefrom.
- 124** This subclass is indented under subclass 123. Device wherein means is also provided to remove product from the outer surface of either the hollow tool, a cooperating tool, or a tool mounted on the hollow tool support.
- 125** This subclass is indented under subclass 123. Device wherein the actuation of the product-moving means is synchronized with movement of the hollow tool in its retraction from the work and cooperating cutter after said tool has made its cut.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
82, for product-moving means initiated by means directly responsive to return movement of the tool.
- 126** This subclass is indented under subclass 123. Device wherein the product-moving means is carried by the other tool which coacts with the hollow tool to form a tool pair*.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
136+, and see the Notes thereto.
- 127** This subclass is indented under subclass 123. Device wherein the ejector slides back and forth within the tool cavity under the influence of a smooth surface, irregularly shaped member rotatable or slidable operating against the ejector or against a motion-transmitting means between said member and the ejector.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
115+, for a device of this type wherein the hollow cutter is mounted on the periphery of a rotary member.
- 128** This subclass is indented under subclass 123. Device wherein the ejector slides back and forth within the tool cavity and includes, or is provided with, compressible or extensible elastic means for urging it in one of said directions when compressed or extended.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
115+, for a device of this type wherein the hollow cutter is mounted on the periphery of a rotary member.
- 129** This subclass is indented under subclass 111. Means including an instrumentality for moving the means (a stripper) which causes relative motion between the cutter and product, such

- instrumentality moving stripper in a definite temporal relationship with respect to the cutter's movement into and out of cutting engagement with the work.
- (1) Note. This and indented subclasses do not include patents for strippers or ejectors operating upon the product of circumferentially edged revolving tools, for which see subclasses 113+.
- (2) Note. For a holddown clamp (or other form of clamp) timed with tool stroke, see subclasses 375+.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 113+, for a stripper or ejector for removing a product from a revolving cutter in timed relation with the tool's motion; and see (1) Note, above.
- 123+, for an ejector for removing a product from within a hollow cutter, and moved in time relation to a tool stroke.
- 375+, and see (2) Note, above.
- 130** This subclass is indented under subclass 129. Device in which the stripper may be removed from or placed in product-moving relation with the tool, to disable the stripper or enable it to perform its function, either at the will of the operator or by the machine itself during its operation.
- 131** This subclass is indented under subclass 129. Device in which means are provided to lock the stripper in product contacting position, and the movement of the tool out of cutting engagement with the work actuates a mechanism to release the lock after the tool is withdrawn from the product, so as to permit the stripper to withdraw.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 125, for a similar device operative with a hollow cutter.
- 399, for other interlock means in a cutting machine.
- 132** This subclass is indented under subclass 129. Device wherein more than one stripper is provided to strip a multiplicity of tools, and each stripper acts to remove the product from only one tool.
- 133** This subclass is indented under subclass 129. Device wherein one stripper is provided which acts to remove the product simultaneously from more than one tool.
- 134** This subclass is indented under subclass 129. Device in which the part of the stripper which contacts the product comprises, or is mounted on one end of, a thin flexible resilient element; and the other end of the element is fixedly attached to some part of the machine.
- 135** This subclass is indented under subclass 129. Device wherein the stripper-moving instrumentality comprises one or more levers which are pivoted to a part of the machine or to each other.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 127, for an ejector-actuating linkage which is actuated by a cam.
- 131, for a linkage which latches a stripper in position and which is released by the return movement of the tool.
- 136** This subclass is indented under subclass 129. Device in which the stripper is mounted on a moving tool or its support* and moves with respect to, and in timed relation with, said tool and support.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 115+, for a stripper or ejector mounted on a rotary tool.
- 126, for an ejector carried by a cutter which cooperates with a hollow tool.
- 218, for a pilot or locating pin carried by a moving tool or tool support.
- 294, 319, and 382, for a work gripper or clamp mounted on a moving tool or tool support.
- 395, for a work-stop abutment mounted on a moving tool or tool support.
- 137** This subclass is indented under subclass 136. Device in which the stripper is actuated by means applying a force to a gas or liquid, which gas or liquid applies a moving force (directly or indirectly) to the stripper.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 390, and 461, for a cutting machine having a fluid pressure actuated clamp.
 639, for fluid pressure tool actuating means.
- 138** This subclass is indented under subclass 136. Device in which (a) the stripper or its mounting includes an elastic, resilient and/or flexible element, which element is compressed or extended during the cycle of operation, and whose tendency to return to its normal state urges the product away from the tool; or in which (b) the stripper is mounted on the tool or tool support by means of a lost-motion connection (in which gravity acts on the stripper to urge the stripper into contact with the product as the tool is withdrawn).
- (1) Note. An original patent for an elastic, rubberlike, resilient mounting for a non-elastomeric stripper will be found in this subclass (138).
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 128, for a resiliently biased stripper which ejects a product from within a hollow cutter.
 134, for a tool-synchronized stripper which is carried on an end of a spring arm.
 142+, for a tool-synchronized stripper not carried by the moving tool or its support and which is biased against the product.
- 139** This subclass is indented under subclass 138. Device in which that portion of the stripper which engages the product is made of an elastic, rubberlike, resilient material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 138+, for an elastic, rubberlike mounting for a nonelastomeric stripper.
- 140** This subclass is indented under subclass 138. Device in which the compressed or extended element is an elongated or coiled flexible and resilient metallic member (e.g., coil spring).
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 128, for a spring-urged means to eject product from a hollow cutter.
 134, for a device in which a tool-synchronized stripper is carried on an end of a spring arm.
 143, for a similar device which is not carried by the moving tool or its support.
- 141** This subclass is indented under subclass 138. Device in which the mounting of the stripper on the tool or tool support* permits relative motion of the stripper with respect to such tool or support, and in which the force of gravity acts to urge the stripper against the product to separate the product from the tool.
- 142** This subclass is indented under subclass 129. Device in which (a) the stripper or its mounting includes an elastic resilient and/or flexible element, which element is compressed or extended during the cycle of operation, and whose tendency to return to its normal state urges the product away from the tool; or in which (b) the stripper is mounted on its support by means of a lost-motion connection in which gravity acts on the stripper to urge the product away from the tool.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 128, for a resiliently biased means which ejects a product from within a hollow cutter.
 134, for a tool-synchronized stripper which is carried on an end of a spring arm.
 138+, for a stripper biased against the product, which stripper is carried by the moving cutting element or its support.
- 143** This subclass is indented under subclass 142. Device in which the compressed or extended element is an elongated or coiled flexible and resilient metallic member (e.g., coil spring).
- 144** This subclass is indented under subclass 111. Device wherein movement of the means (stripper) for causing relative motion between the cutter and product is effected by hand manipulation of the stripper itself or of a device which controls its movement.

145 This subclass is indented under subclass 111. Device in which the means (stripper) for causing relative motion between the cutter and product is fixed with respect to machine parts which do not have a cyclic motion.

146 This subclass is indented under subclass 145. Device wherein the stationary stripper substantially surrounds a tool during its cyclic motion.

147 This subclass is indented under subclass 109. Device which includes a housing having a product delivery opening, which opening is adapted to be selectively obstructed so as to prevent egress of the product (thus also preventing entry of undesired objects) there-through.

(1) Note. The instrumentality which effects the blocking may be a cutting tool.

148 This subclass is indented under subclass 109. Device in which a flexible element is located between the tool and the work such that, in cutting, the flexible member will take the shape of the tool, transmit the cutting force of the tool to the work, and then urge the product away from the tool which has produced it.

(1) Note. The subject matter of this subclass is distinguished from that of subclasses 111+, in that a tool provided with a flexible element of the type of this subclass does not directly engage the work or product.

149 This subclass is indented under subclass 109. Device comprising a guideway, inclined to the horizontal and vertical planes and so disposed as to receive cut pieces for movement therealong, provided with means for engaging a cut piece to urge it along the guideway, or to brake it, while it is disposed on or within the confines of the guideway.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclass 534 for a power-driven conveyor combined with a chute having means to retard movement of the conveyed load.

150 This subclass is indented under subclass 109. Device including means for positively moving the product, said means being supported against gravity by a tool support*.

151 This subclass is indented under subclass 109. Device in which the means for propelling the product includes means to engage and firmly secure the product against movement relative to the propelling means at least during movement of the product away from the cutting zone.

(1) Note. Included within the scope of the term “gripper means” are devices which engage and grasp two opposed surfaces of the product as well as devices which engage one surface and retain it against the propelling means (e.g., a magnet, clamp jaw, perforating pin, suction gripper, etc.).

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclasses 468.2+ and 470.1+ for a conveyor having load gripping members, subclasses 679 and 690 for a conveyor having magnetic load holders, and subclasses 692+ for a conveyor having load impalers.

271, Sheet Feeding or Delivering, subclasses 204+ for sheet delivery apparatus including means to grip the sheet.

152 This subclass is indented under subclass 151. Device in which the securing means includes a perforated surface and means to draw air through the surface so as to cause the product to adhere to said surface under the influence of atmospheric pressure.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclass 428, 438, 449+, and 689.1 for a conveyor having means for applying suction to the conveyed load.

271, Sheet Feeding or Delivering, subclasses 194+ for sheet delivery apparatus including pneumatic means.

- 153** This subclass is indented under subclass 151. Device in which the propelling means moves to and from the cutting zone in a straight line.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, sub-classes 468.2+ and 470.1+ for a reciprocating conveyor having load-gripping members.
- 271, Sheet Feeding or Delivering, subclass 85 for sheet delivery apparatus including reciprocating sheet gripping means.

- 154** This subclass is indented under subclass 151. Device in which the propelling means moves in an arc of a circle, either in the same direction or to and from the cutting zone.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, sub-classes 468.2+ and 470.1+ for an oscillating conveyor having load-gripping members.
- 271, Sheet Feeding or Delivering, subclass 82 for rotary sheet delivery apparatus having gripper means.

- 155** This subclass is indented under subclass 109. Device which comprises a continuous web- or strand-like member (e.g., a belt or chain) which moves the product while the product is supported thereby.

- (1) Note. In the case wherein the product conveyor also is effective to move the work into cutting position, a patent directed to such device will be placed originally in this subclass only if the conveyor is claimed in terms of its specific product handling function.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 88, and 91+, for a conveyor operative to move a stack of product pieces.
- 94+, for a conveyor which functions to deliver product pieces to a stack holder.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, sub-classes 804+ for an endless belt conveyor.
- 271, Sheets Feeding or Delivering, subclass 67, 69 and 198+ for sheet delivery apparatus including endless conveyor means.

- 155.1** This subclass is indented under subclass 155. Device including means to remove the product from the endless conveyor.

- (1) Note. In many of the devices in this subclass, the same conveyor moves both work and product.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 418+, for a work conveyor means and additional means to engage the work and orient it relative to a tool station.
- 732, for means to position work transversely on a moving conveyor.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, sub-classes 367+, 370.07 through 370.09, 370.1, 370.11 through 370.13, 426+, 463.1+, 497, 597+, 599, 637, and others for means for moving an article or material off a conveyor.

- 156** This subclass is indented under subclass 109. Device which includes one or more cylindrical or spherical members, each rotatable about an axis transverse to the path of the product and supporting, guiding or moving the product in said path.

- (1) Note. Patents disclosing either idling or powered rollers, in train or in opposed pairs, are included in this subclass.

SEE OR SEARCH CLASS:

- 193, Conveyors, Chutes, Skids, Guides, and Ways, subclasses 35+ for rollerways.
- 198, Conveyors: Power-Driven, sub-classes 385+, 387, 501, 604, 608, 611+, 624, 779, and 780+ for rollers carrying a load, subclass 840 for rollers guiding a load supported on an

- endless belt conveyor, and subclasses 359+ and 539 for a nonpowered roller conveyor combined with a power-driven conveyor.
- 271, Sheet Feeding or Delivering, subclass 71, 72 and 314+, for sheet delivery apparatus including rotary conveyor means.
- 157** This subclass is indented under subclass 109. Device which permits downward movement of the product by either pivotal movement of a means holding the product against gravity, thereby to provide an inclined surface down which the product may slide; or by complete removal of such means from beneath the product, thereby to permit free fall.
- (1) Note. The platform of this subclass must be moved after, or simultaneously with, the cutting stroke which produces the product to be handled by the platform. If a platform is, for instance, tilted to an inclined position prior to the cutting stroke (so that the product, instead of being supported on a platform which may tilt to urge the product to slide, is allowed to drop onto an inclined plane), such platform is considered an adjustable or movable chute or plane, the search for which is in subclass 165.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 165, for a chute or inclined plane down which product may slide; and see (1) Note, above.
- SEE OR SEARCH CLASS:
- 198, Conveyors: Power-Driven, subclasses 535+ for a chute swingable between horizontal and inclined positions.
- 158** This subclass is indented under subclass 109. Device provided with means to engage a product piece and move it bodily in a straight line path in a direction which is opposite or transverse to the direction in which (a) the piece is moving as it leaves the tool or (b) the work is moving as it enters the cutting zone.
- SEE OR SEARCH CLASS:
- 198, Conveyors: Power-Driven, subclass 598 for an endless belt conveyor that shifts a load laterally of another conveyor.
- 159** This subclass is indented under subclass 158. Device in which the product moving means is pivoted and has a to-and-fro motion about said pivot.
- SEE OR SEARCH CLASS:
- 198, Conveyors: Power-Driven, subclasses 370.07 through 370.09, 370.1, 370.11 through 370.13, 426+, 468.1+, 598 and others for a swingable conveyor that shifts a load laterally of another conveyor.
- 160** This subclass is indented under subclass 158. Device in which the product engaging portion of the product moving means has a translatory to-and-fro motion in a plane.
- SEE OR SEARCH CLASS:
- 198, Conveyors: Power-Driven, subclasses 370.07 through 370.09, 370.1, 370.11 through 370.13, 429+, 597+, and others for a linearly reciprocating conveyor that shifts a load laterally of another conveyor.
- 161** This subclass is indented under subclass 109. Device in which the propelling means moves the product otherwise than in a straight line.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 150, for such means mounted on a tool support.
- 162** This subclass is indented under subclass 109. Device including passive means which is operative to define, limit, or change the path of (without terminating), product movement (i.e., to direct, wholly or partially, the course of moving product).
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 105+, for a guide which serves to separate moving product portions.

438+, for means to guide moving work; and see the Notes thereto.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, sub-classes 351+, 367, 442, 525, 599, and 633+ for passive means for changing the direction of movement of a conveyed load.

163 This subclass is indented under subclass 162. Means in which the product is moved by the work or by means that moves work to the tool station, and in which the passive means is so disposed as to present an obstacle or obstruction to the unimpeded passage of product being so moved; the result being initiation of, or a change in, relative directions of motion of the product and the work or work moving means.

164 This subclass is indented under subclass 162. Device in which the guide is a tubular cavity within a hollow tool or its support, or in a member rigid with the tool or its support, said tool having an aperture and a continuous cutting edge bounding the open end of said aperture and together with said tubular cavity forming a path for the product pieces, away from the cutting zone, which does not follow only a single straight line.

(1) Note. A mere passage coextensive with the cutting edge opening and extending rectilinearly within the hollow tool is not considered a guide for this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

97, for a device including means to form or hold product pieces in stacked relation upon emergence from a hollow cutter.

165 This subclass is indented under subclass 162. Means including a supporting surface or tubular body, disclosed as extending generally from an upper location at one end to a lower at the other (but not extending solely straight up and down vertically) and so positioned that product may travel therealong or therethrough.

(1) Note. The traveling product on or in the chute, plane, or conduit may be moving under the influence of gravity. If, how-

ever, it is moved by claimed mechanical moving means, a patent claiming such guide and moving means will be placed originally in subclass 149 or another subclass devoted to product moving means, and may be cross-referenced in this subclass; if no product moving means is claimed, a patent disclosing such combination (and claiming only the cutter and guide) will be placed originally in this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

149, for means which moves cut pieces along a chute or inclined plane.

157, for a device having a tiltable product support down which the product may slide.

SEE OR SEARCH CLASS:

193, Conveyors, Chutes, Skids, Guides, and Ways, appropriate subclass for a gravity type conveyor.

198, Conveyors: Power-Driven, subclass 311, 359+, 523+, and others for a chute or other gravity conveyor combined with a power-driven conveyor.

166 This subclass is indented under subclass 162. Means comprising an obstacle so placed as to be struck by a product piece as the latter travels through space while unsupported against the force of gravity.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

165, for devices in which the abutment is an inclined chute, plane or conduit.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclass 599 for a guide that deflects a load after it moves off a conveyor.

167 This subclass is indented under the class definition. Device provided with a container or platform to receive and retain the product piece.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

78+, for a device having a receptacle or support provided with a clamp to stop

- and hold the product in the receptacle or on the support.
- 84+, for a receptacle or support which is taught as holding a pile (including stack) of product pieces; and see the Notes thereto.
- 102+, for means to direct product pieces selectively into any one of a plurality of receptacle.
- SEE OR SEARCH CLASS:
- 232, Deposit and Collection Receptacles, subclass 8 for a fare box which receives a ticket and punches it as it is introduced into the device.
- 168** This subclass is indented under the class definition. Device wherein means are provided to remove undesired foreign matter from the work or the tool.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 15+, 22, and 24, for a method of handling work, or product, including application of fluid to same.
- 98+, for product handling device including fluid current application means which means may also be utilized to remove waste products of the cutting operation.
- SEE OR SEARCH CLASS:
- 15, Brushing, Scrubbing, and General Cleaning, appropriate subclasses, for cleaning means broadly; and see search Notes thereto.
- 173, Tool Driving or Impacting, subclasses 197+ for a tool driving or impacting means having a work cleansing feature.
- 169** This subclass is indented under the class definition. Device that includes means to direct upon or to the tool or work a quantity of liquid, gaseous, or pulverulent material; which material is not intended to form a permanent coating on, and does not effect movement of, such tool or work.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 15+, 17, 22, and 24, for method of handling work, or product, including application of fluid to same.
- 53, and 177, for means and process, respectively, for cutting by direct application of fluent pressure.
- 98+, for product handling by fluid current means.
- 168, for means to clean work by fluid application.
- 407, for apparatus to move work by fluid current.
- SEE OR SEARCH CLASS:
- 30, Cutlery, subclasses 123.3+, for cutting implements having means to direct a fluid upon the tool or a guide in contact therewith.
- 118, Coating Apparatus, subclass 15 and 35+ for cutter combined with means to apply a substantially permanent coating.
- 170** This subclass is indented under the class definition. Device which includes means to maintain or alter the temperature of the device or work.
- (1) Note. Heating or cooling of the work to the extent of changing its state (e.g., from solid to liquid), other than for the purpose of effecting a cut by means of a solid tool, has been considered a shaping or treating operation beyond the scope of this class (83). Patents for such treating or shaping means combined with cutting means have been placed elsewhere; for example, on the basis of the type of material so shaped or treated.
- (2) Note. The patents of this and the indented subclass primarily differ from related devices in Class 219, Electric Heating, in that the tool herein disclosed maintains physical contact with, and bodily penetrates the workpiece during the cutting operation; even though melting of the workpiece is achieved during such tool penetration.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 15+, for corresponding process.
- 169, for apparatus for applying a transient, nonpropellant fluid to the tool or work, which liquid may heat, cool, or maintain the temperature of, the tool or work.

SEE OR SEARCH CLASS:

- 62, Refrigeration, appropriate subclasses, particularly subclasses 56+ for methods and subclasses 320+ for apparatus, for cutting combined with freezing or combined with cooling of the type classified in that class (62).
- 219, Electric Heating, subclasses 68+ for cutting including electrically heating metallic work.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 138+ for processes of molding and shaping within the class definition, when combined with a cutting or severing step and see (1) Note above.

171 This subclass is indented under subclass 170. Device in which the temperature controlling means maintains or alters the temperature of the tool.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 16, for corresponding method.

SEE OR SEARCH CLASS:

- 30, Cutlery, subclass 140 for a heated cutter including significant heating structure.
- 101, Printing, subclass 8, 9+, 21, 25, 27, and 31 for an embossing or penetrating printer with heating means.
- 128, Surgery, subclasses 303.14+ for a heated surgical cutter.
- 219, Electric Heating, subclass 241 for means to electrically heat a cutter.

174 This subclass is indented under the class definition. Apparatus including means to dress the tool.

- (1) Note. The means to dress may operate on either the active or passive cutting element.

SEE OR SEARCH CLASS:

- 30, Cutlery, for a specifically recited tool of that class with a means to sharpen same.
- 76, Metal Tools and Implements Making, for a specifically recited tool of that class with a means to sharpen same.
- 451, Abrading, for sharpening by abrading, generally.

174.1 This subclass is indented under subclass 174. Device wherein the dressing means acts on a tool which is (a) immovable, or (b) rotatable or oscillatable in one plane about a single, immovable axis.

- (1) Note. A tool sharpener in combination with a tool which is rotatable about a movable axis or about two or more axes. (e.g., band saw) or movable into another plane, will be found in this class, subclass 174.

175 This subclass is indented under the class definition. Apparatus including means to subject the work within the cutting zone to tensile forces to effect elongation of same within its elastic limit.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 18, for a related process.

SEE OR SEARCH CLASS:

- 140, Wireworking, subclasses 139+ for means to stretch and cut wire.

176 This subclass is indented under the class definition. Apparatus including means to impart an impermanent change of shape (i.e., within the elastic limit) to work material located in the cutting zone - except apparatus in which such means comprises a rotatable cylindrical anvil about which work is trained and which cooperates with another cutter to produce substantially the same cut that would be produced if the work were presented rectilinearly to such other cutter.

- (1) Note. This subclass includes (but is not limited to) patents for devices which deform the work material, as above defined, and in whose operation such deformation is prerequisite to effect a predetermined line of cut; that is to say, the desired cut could not be effected in the absence of the deformation while operating the machine in the intended manner.
- (2) Note. Thus, a patent directed to means for compressing, or stretching, a resilient workpiece and subsequently cutting same to impart a dished product surface configuration upon release of the deforming forces would be properly placed in this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
17+, for a corresponding method.

SEE OR SEARCH CLASS:
226, Advancing Material of Indeterminate Length, subclass 88 for means to deform material of indeterminate length to facilitate feeding of the material.

- 177** This subclass is indented under the class definition. Apparatus wherein one tool comprises a fluent pressurized medium which directly contacts the workpiece to effect a predetermined line of cut by displacing the portion of work so contacted past the cutting edge of a cooperating tool element or by coaction with a controlled directly opposed second fluent pressurized medium.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 53, for a method of cutting by the direct application of fluent pressure to the work.
- 402, for fluid current apparatus for moving work past a stationary cutter in a continuing movement.

- 178** This subclass is indented under the class definition. Means in which a tool is disposed within a generally tubular portion of a workpiece and, either alone or in cooperation with another

tool, operates on the internal surface of the piece.

- (1) Note. The “generally tubular portion” comprises a wall which presents, in transverse cross-section, a substantially closed perimeter.
- (2) Note. The internal tool must be in position within the hollow work at initiation of cutting.
- (3) Note. Patents disclosing a tool oscillating about a fixed center during the cutting stroke and its retraction therefrom will be found in this subclass. Patents disclosing other tool motions will be found in subclasses indented hereunder.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 196+, for cutting work (which may be hollow) by the misalignment of aligned apertures.
- 315+, and 597+, for an oscillating tool which does not cut from within a hollow workpiece.

SEE OR SEARCH CLASS:

- 82, Turning, subclass 82 for a turning device of the severing or cutoff type wherein the tool, or tools, lies within the work.
- 166, Wells, subclasses 55+ for apparatus for cutting a well conduit in situ and subclasses 297+ for processes of cutting a well conduit in situ.
- 175, Boring or Penetrating the Earth, subclasses 2+ for subject matter relating to a device for firing a bullet or exploding a shaped charge within an inaccessible bore to penetrate the earth formation or perforate or cut a casing or other wall member in the bore.

- 179** This subclass is indented under subclass 178. Apparatus wherein a tool (or tools) is inserted within a workpiece, prior to the introduction of the workpiece into the cutting zone, in such manner that the tool derives substantially all of its support either directly or indirectly from the workpiece itself.

180 This subclass is indented under subclass 178. Apparatus provided with a work support including means to enlarge a cross-sectional portion thereof, so that such support will frictionally engage the internal surface of the tubular work.

- (1) Note. The expanding mandrel may function to immobilize for work and/or to position the internal tool for cutting.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

623, for means to move a cooperating cutter member.

SEE OR SEARCH CLASS:

269, Work Holders, subclass 52 for an expanding mandrel which is not a chuck or socket.

279, Chucks or Sockets, subclasses 2.01+ for an expanding mandrel in the form of a chuck or socket.

181 This subclass is indented under subclass 178. Apparatus wherein means to move, or render active, means to maintain or retain work, or means to move, or render active means presenting an obstacle or bar to work movement; is identical with or cooperates significantly with means to move the tool in its cutting cycle.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

374+, for means as above defined but not related to a tool inside hollow work; and see search Notes thereto.

182 This subclass is indented under subclass 181. Means wherein a work immobilizing element cooperates with a work support to grip the work frictionally, to move the work into aligned relation with the tool, and to hold it in such position.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

206, and 465, for related clamp structure.
418+, with additional means to engage and orient work.

183 This subclass is indented under subclass 178. Apparatus including means to present work to the tool, which means operates in timed relation with means to impart movement to the tool during the cutting cycle.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

202+, for tool engaging work during dwell of intermittent work-feed.

284+, for a tool whose cutting motion has component in direction of moving work.

350, for a tool timed with moving work, in general.

184 This subclass is indented under subclass 178. Apparatus provided with means to adjust and align tools relative to one another in preparation for cutting.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

248, for means to position datum plane of tool.

549+, for plural tool selectively engageable.

559+, for tool pair adjustable as a unit.

561, for relatively adjustable tool with flat surfaced cooperating member.

185 This subclass is indented under subclass 178. Apparatus wherein a cutting tool moves in a path which is neither solely rectilinear nor solely circular during the tool stroke*.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

523, for other forms of compound tool motion.

644+, for reciprocating tool motion combined with tilting in plane of tool stroke.

646+, for uniplanar compound tool motion.

186 This subclass is indented under subclass 185. Apparatus wherein the cutting means comprises at least one tool pair consisting of an internal edged tool and an external tool provided with a peripheral cutting edge substantially completely surrounding the work, each such tool having a surface lying in a plane common to both tools and along which surface the cutting edge is disposed, so that shearing of

the work occurs in the common plane, and in which the peripheral cutting edge of the external tool substantially completely surrounds the tubular work.

- (1) Note. One or both of the tools may be active in the cutting operation and the conformation of either tool to the work surface may be modified; as, for instance, to provide relieved sections resulting a tab portions of such surface, or to result in a progressive cutting operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 179, for related cutting means wherein the tubular work is prepacked with an internal tool.
189+, for an annulus and disc type tool pair having rectilinear motion.

- 187** This subclass is indented under subclass 178. Apparatus wherein a cutting tool follows a closed circular path, in one direction only thereof, during the cutting stroke.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 331+, for a rotary flying cutter.
469+, for a rotatable disc tool and carrier therefor, or a rotatable disc tool pair.
591+, for revolving tool motion, generally.

- 188** This subclass is indented under subclass 178. Apparatus wherein the movement of a tool, during the tool stroke*, is confined to one or more straight line paths.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 613+, for a rectilinearly reciprocating tool, in general.

- 189** This subclass is indented under subclass 188. Apparatus wherein the cutting means comprises at least one tool pair consisting of an internal edged tool and an external tool provided with a peripheral cutting edge substantially completely surrounding the work, each such tool having a surface lying in a plane common to both tools and along which surface the cutting edge is disposed, so that shearing of the work occurs in the common plane, and in

which the peripheral cutting edge of the external tool substantially completely surrounds the tubular work.

- (1) Note. One or both of the tools may be active in the cutting operation and the conformation of either element to the work surface may be modified; as for instance, to provide relieved sections resulting in table portions of such surface, or to result in a progressive cutting operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 179, for related cutting means wherein tubular work is prepacked with an internal tool.
186, for annulus and disc type tool pair having compound motion.

- 190** This subclass is indented under subclass 189. Means wherein at least one member of the tool pair moves in a multiplicity of straight line paths during the tool stroke*.

- 191** This subclass is indented under subclass 188. Means , wherein the tool inside the hollow work moves in effecting the cut.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 179, for means including internal tool(s) prepacked in work.
186, and 189+, for annulus and disc type tool pair, of which the internal disc tool may be active.

- 192** This subclass is indented under subclass 188. Means wherein a plurality of tools is disposed around the outer periphery of the tubular work and each moves, in coaction with one or more internally disposed tools, to effect a cut.

- (1) Note. The external tools may be supported on a common carrier, as in a conventional multiple punch ram means; or on separate carriers, including structurally independent actuating means, and may each contribute to a single combined cut line or function to effect separated cuts on the common work piece.

- 193** This subclass is indented under subclass 192. Means wherein the active external tools move relatively toward one another during cutting and substantially normal to the axial extent of the tubular work.
- (1) Note. The tools may function either simultaneously or sequentially to produce a cut or cuts lying in a substantially common plane.
- 194** This subclass is indented under subclass 193. Apparatus, wherein the means to move the tools to effect the cut comprises a plurality of cams which are mounted on a single carrier.
- (1) Note. The common support for the multiple cams is generally a rotary or oscillating member.
- (2) Note. For definition of a cam, see the definition of Class 74, subclasses 567+.
- 195** This subclass is indented under subclass 178. Apparatus, wherein means, responsive to an operative's volition, are provided to move the work relative to a tool and preparatory to initiation of the tool stroke*, or to cooperate with a significant feature of the work structure to restrain the moving piece from further movement.
- (1) Note. This subclass includes patents for cutting machines with means to accomplish the necessary locating of work within a cutting zone, in order that the work may be in proper alignment with the cutter operating thereon, as distinguished from means to feed the work to such zone.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 401+, for means to move work relative to a tool station.
 451+, for means to immobilize or stabilize work generally.
- 196** This subclass is indented under the class definition. Means, in which two adjacent members are provided, each with an opening, through both of which openings a workpiece extends simultaneously, each adapted (as disclosed) to enclose a sufficient portion of the periphery of the workpiece extending therethrough to prevent sidewise escape of the workpiece therefrom, which device includes means to move one member relative to the other so that the workpiece caught between the moving members is severed by virtue of its being forced against the edge of an opening, or against the edge of a member-carried tool extending into such opening, or against both.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 178+, particularly subclasses 179, 186, and 189+, for a device wherein a tool is located inside hollow work and cooperates with an outer, annular cutter.
- 197** This subclass is indented under subclass 196. Means having, in addition to the apertured tools, a cutting device of another kind which itself constitutes subject matter for this class (83).
- 198** This subclass is indented under subclass 196. Means in which one or both of the apertured members has a motion only in a straight line path during its tool stroke*.
- 199** This subclass is indented under subclass 196. Means in which one or both of the apertured members has a motion which is confined to rotation or oscillation about a single center.
- 200** This subclass is indented under subclass 199. Means in which one or both of the apertured members has more than one cutting opening.
- 200.1** This subclass is indented under the class definition. Device wherein the cutting member is substantially one-dimensional; i.e., the dimensions of its cross-section are negligible relative to its length, and which member surrounds a portion of the work surface prior to cutting, thus defining a plane; and which device includes means to apply or increase stress in the cutting member so that the cutting member moves into the work in the plane initially defined.
- (1) Note. The cutting member may or may not completely encircle the work. In the latter case, reaction to the cutting force

will be provided by a work-stop abutment.

SEE OR SEARCH THIS CLASS, SUBCLASS:

651.1+, for a wire-type tool or a wire-type tool and support which does not function in a work-inclosing manner.

SEE OR SEARCH CLASS:

72, Metal Deforming, subclass 292 for a device for deforming a metal work-piece by tightening a flexible chain or band around the work.

100, Presses, subclasses 1+ for a process or apparatus for tightening a binder about material to compress it.

202 This subclass is indented under the class definition. An apparatus including means to sequentially stop and move, or stop and permit movement of, the work at the tool zone; and including tool actuating means which synchronously brings the tool into cutting contact with the work while the latter is at rest or simultaneously with the stopping of the work.

(1) Note. The work may be brought to a halt by a device such as a clamp jaw or an abutment stop effective to halt that portion of the work in the tool zone while work-feed means continually urges another portion toward the tool with consequent buckling or slippage, (see subclass 262 indented hereunder).

(2) Note. The work may be moved simply by gravity, no work advancing mechanism being provided, (see subclass 268 indented hereunder).

(3) Note. A portion of the work remote from the tool zone may be continuously in motion as, for example, work unwinding from a continuously rotating supply roll.

SEE OR SEARCH THIS CLASS, SUBCLASS:

350+, for a device wherein the work is fed constantly to a tool zone where it is intermittently acted on by an actuated tool having no component of motion in the direction of work-feed, and

where no provision is made for halting the work before it is engaged by the tool.

SEE OR SEARCH CLASS:

28, Textiles: Manufacture, subclasses 107+ for needle felting machines having cycle of intermittent work moving and needing.

112, Sewing, appropriate subclasses, for machines which advance work to sewing station and hold it stationary while it is being pierced by the needle.

198, Conveyors: Power-Driven, subclass 339.1 for a conveyor that dwells at a work station, and subclasses 858+ for a conveyor having indexed or intermittent drive means.

226, Advancing Material of Indeterminate Length, appropriate subclasses for methods of, and apparatus for, feeding material without utilizing the leading or trailing ends to effect movement of the material, particularly subclasses 120+ for structure for advancing material intermittently.

234, Selective Cutting (e.g., Punching), appropriate subclasses, for a selective cutting device (usually termed a card or tape punch) of the step-by-step type.

408, Cutting by Use of Rotating Axially Moving Tool, subclasses 70+, for means to cut in the manner of that class during the dwell of intermittent workfeed.

203 This subclass is indented under subclass 202. Device in which the synchronous relationship between work moving and tool moving means is disrupted during or after each tool cycle in such manner that the reestablishment of such relationship and initiation or continuation of a succeeding cycle requires the intervention of an external force or stimulus.

(1) Note. Unicyclic operation is characterized by the requirement of two inputs: one to supply actuating power and the other to intervene and supply an unlocking force without which the machine could not resume operation, as distinguished from the usual machine which operates whenever power is supplied to

it. Some type of “nonrepeat” mechanism is required as part of the invention.

- (2) Note. Many patents disclosing machines capable of unicyclic operation are to be found in following subclasses, where the means which confers such capability is not claimed. See particularly the stamp or ticket dispensers in subclasses 208, 210, 224, 231+, 242+.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 69, for stopping means effective upon completion of predetermined number of tool cycles.
252, for supplemental manual feed required to complete the cutting cycle.
283, for one-revolution clutch in tool actuating means.
484, for unicyclically movable carrier for rotatable disc tool.
524+, for a device for moving a tool through one cutting stroke only.

204 This subclass is indented under subclass 203. Device which comprises means for changing the type of operation from unicyclic to continuous operation or from continuous to unicyclic.

- (1) Note. Device for changing from one type of operation to another type for which separate subclasses are provided, neither type being “unicyclic”, will be found in subclasses directed to the specific types of operations concerned.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 57, for a device to alter the cyclic operation of a cutting machine in some respect, but only as long as an intervening force is maintained. (Example: a machine operator may hold a push-button depressed to obtain short products for sampling or testing purposes).
240+, for adjustment of tool position or stroke, work position, length of work-feed increment, etc.

205 This subclass is indented under subclass 203. Machine wherein the tool cycle is initiated and terminated solely by mechanical elements (to

the exclusion of electrical, electronic, or chemical means).

- (1) Note. The mere presence of an electric driving motor an necessary manually or mechanically actuated switch does not exclude the combination thereof, with the mechanical initiating and terminating means, from this subclass.
(2) Note. Hydraulic or pneumatic devices are considered “mechanical” for the purposes of this definition.

206 This subclass is indented under subclass 202. Device wherein a portion of a frictional work-gripping device as claimed exerts a centering, registering, or aligning effect on the workpiece at a tool station.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 182, for a clamp which aligns hollow work with respect to a tool.
262, for a clamp used to cause a dwell in the work motion by clamping or blocking the moving work.
282, for a work clamp cyclically actuated in a cutting machine.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, subclasses 343.1+ for a conveyor combined with means for clamping the conveyed load in position for working at a work station.

207 This subclass is indented under subclass 202. Device wherein the only work-moving means is a work stop which is cyclically moved against the work which has been presented thereto (by means not claimed), to position or register the work prior to the tool stroke.

- (1) Note. The “stop” in this subclass serves only to give the final location or positioning motion to work which has been presented to the machine, manually or by unclaimed work-moving means, and the stop is not claimed as a clamping or gripping means.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 206, 282+, and 452+, for an actuated abutment or jaw which cooperates with another abutment to frictionally grip the work.
- 250+, for such device combined with ordinary work-feed means.
- 268+, and 391+, for abutment work stops which do not move the work.
- 418+, for work moving means and an additional work positioning means.
- 208** This subclass is indented under subclass 202. Device including a detector* which is moved by, and to an extent proportional to movement of the work; further including means to effect a signal or impulse only when the extent of detector movement reaches a predetermined amount; and further including a transmitter* connecting said detector means to a means to effect or initiate work deceleration, work stoppage and/or work cutting as a direct or indirect result of the receipt by said effective means of such detected and transmitted signal or impulse.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 369, for similar structure in which only the work cutting is claimed.
- 209** This subclass is indented under subclass 202. Device including a detector* for work, a transmitter*, and means to stop the movement of the work, either directly, (as by engagement of said means with the work,) or indirectly, (as by stoppage of a work-moving means) as a result of the receipt by said means of such detected and transmitted signal or impulse.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 63, for means, responsive to work sensing means, to stop operation of a part or all of the machine in a random manner.
- 367, for similar structure for stopping work movement.
- 370+, for similar structure to actuate tool feed.
- 399, for means, responsive to condition or location of a machine part, for controlling operation of another part; and see the Notes thereto.
- SEE OR SEARCH CLASS:
- 198, Conveyors: Power-Driven, appropriate subclasses for different types of conveyors or systems of plural conveyors having operation control means responsive to a condition of a conveyor or to a condition of the conveyed load.
- 210** This subclass is indented under subclass 209. Device including means to effect actuation of a cutter through a tool cycle as a direct or indirect result of the receipt by said means of the detected and transmitted signal or impulse.
- 211** This subclass is indented under subclass 202. Device including a detector* for work, a transmitter, and means to effect actuation of a cutter through a tool cycle, as a direct or indirect result of the receipt by said means of such detected and transmitted signal or impulse.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 370+, for similar structure to effect tool movement against work in which work movement or stoppage is not recited.
- 212** This subclass is indented under subclass 211. Device in which the detector includes a projection in the path of movement of the moving work, which projection halts the work by engagement of the work with said projection.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 262, and 268+, for other means to effect work stoppage by an abutment.
- 212.1** This subclass is indented under subclass 202. Device wherein at least two tools act at a cutting zone, one of which tools is stationary and is at all times disposed to engage the work, and the other of which tools engages the work during the workfeed dwell and which has a cutting plane perpendicular to the direction of work movement.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 404.1+, for a device having means to move work from one tool station to another, which tool stations are disposed at right angles to one another.
 425+, for a device which includes means to move the work relative to a tool which engages the work in a continuous manner (i.e., the cutting plane of the tool is perpendicular to the direction of the work movement).
- 213** This subclass is indented under subclass 202. Apparatus in which more than one tool moves to operate on the work, in the same general cutting zone and including means for actuating one tool after another.
- (1) Note. This subclass excludes patents claiming plural tools at different tool stations (separated by a distance equal to at least the length of work-feed increment) for which see subclass 255.
- (2) Note. This subclass includes patents for machines wherein different tools are actuated in the same general cutting zone in successive dwell periods of the work.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 255+, for a succession of tools operating on the same workpiece or same general area of a continuous workpiece, during different dwell periods, and see (1) Note above.
- 214** This subclass is indented under subclass 213. Apparatus in which all of the plural tools operate on the stopped work before the work again moves.
- 215** This subclass is indented under subclass 202. Device in which the tool, in addition to its advance toward, and retraction from, the work in each tool cycle*, undergoes another motion (which may be for the purpose of relocating the tool, feeding the work, etc.).
- (1) Note. The tool may be in noncutting motion while work is being fed.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 284+, for a tool which moves with the work during cutting (e.g., a flying cutter).
- 216** This subclass is indented under subclass 215. Device, wherein the tool is given its additional motion during the period in which the work is stationary.
- (1) Note. The tool may merely be shifted to a different position during one dwell of the work; or may be repeatedly actuated to make a plurality of cutting strokes each effective on different positions of the work, patents claiming the latter being found in indented subclass 217.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 215+, for a device wherein some of the tool motions may occur during movement of the work.
 217, and see (1) Note above.
- 217** This subclass is indented under subclass 216. Device including means to cause the tool to perform a number of cutting strokes while the work is at rest.
- (1) Note. Such device is frequently used to make a number of cuts across a wide strip of work, with only one tool or a relatively small number of tools.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 219+, for a device in which work is moved in different directions between successive tool strokes, whereby a plurality of cuts may be made across a strip of work during a dwell in the forward advance of the work.
- 218** This subclass is indented under subclass 215. Device including means to cause a tool to move the work through all or a part of the work-feed increment, by engagement of tool and work during the additional motion of the tool.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 226+, where the tool itself does not engage work to feed it, but a work-feed means is actuated by the tool support during advancing or retracting movement of the latter.
- 284+, for a device wherein the tool may feed the work while cutting it (i.e., a flying cutter).

219 This subclass is indented under subclass 202. Device including means to effect successive increments of work-feed in different directions, (as when following a contour), in presenting work for successive operations by the same tool.

- (1) Note. This subclass does not include devices where work can be manually shifted in position between cuts while a machine-driven work-feed means merely continues to move work in the same direction (as in an ordinary sewing machine); See subclass 249 for disclosures of such devices.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 71, for control of machine functions generally by means responsive to indicia on tape or card (i.e., pattern control).
- 249, for feed means modified to facilitate shifting of work by external agency, and see (1) Note.
- 356, for periodic tool actuation timed with moving work, with periodic lateral shift of work (or tool).
- 367, for movement of work responsive to work-sensing means.

220 This subclass is indented under subclass 219. Device wherein there are means to provide a limited number of predetermined directions of work-feed and means to choose one of said number of directions for each advance of the work.

- (1) Note. This subclass includes devices having means for effecting mere reversal of work-feed direction at intervals, as well as machines with “zigzag” or “staggered” work-feeds.

221 This subclass is indented under subclass 202. Device including means, additional to those means which establish the cyclically timed relationship between the tool and work movements, which additional means is effective to block or otherwise prevent the normal cyclic operation of either tool or work moving means, unless the latter two means are located in a desired relationship.

- (1) Note. The interlock is an additional feature provided as a safety precaution rather than part of the work or tool feed drive.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 222, for a device wherein completion of work-feed motion serves to trip a tool actuating means into action, and completion of tool stroke serves to restart the work-feed.
- 380, for an interlock which prevents a tool from starting through its stroke unless a clamp is in actuated position.
- 399+, for an interlock between a plurality of elements, in general and see Notes to subclasses 399+ for other “interlock” subclasses.

222 This subclass is indented under subclass 202. Device having means so associated with tool and work moving means, that a tool upon reaching a predetermined point in its travel causes initiation of the work-feed means, which latter at a predetermined point in its travel will initiate the next tool stroke.

- (1) Note. The definition of this subclass requires successive interactions alternately between tool moving and work moving means (a chain reaction), as distinguished from subclass 221, which requires merely unilateral control of one such means by the other.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 221, for interlock between tool actuating means and work moving means.
- 225+, for work-feed controlled by means on tool or tool support.

- 231+, for tool actuation effected or initiated by work-feed element.
- 399, for interlock between any two elements of a machine, and see the Search Notes thereunder, for other pertinent subclasses.
- 400, for interlock between two elements plus means to initiate an operation upon release of interlock.
- 223** This subclass is indented under subclass 202. Device in which a mechanism, driven by movement of either the tool or the work-feed means, is caused to accumulate potential energy which is later released to actuate the other of the two means.
- (1) Note. This arrangement is found in many small hand-actuated machines, wherein, for example, a tool-retracting spring is stressed during the tool cutting stroke and part of its stored energy is utilized, during the return of the tool, to advance the work into position for the next cut.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 229, for work-feed means driven by tool or tool support on return movement of tool.
- 582+, for a constantly urged tool, especially subclasses 588+ for return-stroke-biased tools.
- 224** This subclass is indented under subclass 223. Device wherein the motion of some portion of the work-feed means is used to accumulate potential energy which is released later in the cycle to actuate the tool.
- (1) Note. The stored energy for the tool may be released by further motion of the work-feed means or by some other agency.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 232+, (tool actuator struck by an element of a work-feed means, during nonfeeding motion thereof) for some disclosures of energy storage.
- 225** This subclass is indented under subclass 202. Device including means mounted on the tool or its support and effective to initiate the establishment of a driving connection (a) from a power source to the work moving means, or (b) from work moving means to the work, and/or the disruption of said connection.
- (1) Note. The tool-mounted means may serve to drive and/or stop the work-feed means, or to control the transmission of power to such means from another source.
- (2) Note. This subclass is distinguished from subclass 262 (which see) by the fact that in the latter subclass, the work is directly halted by clamping or blocking means (which may be mounted on tool or tool support) but the work-feed mechanism continues to move, ineffectively.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 262, and see (2) Note.
- 226** This subclass is indented under subclass 225. Device wherein the tool-mounted means provides the motive power for actuating the work-feed means.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 228, for an auxiliary work-feed means mounted on a tool or tool support.
- 230, for a device wherein the motion of tool-carried means merely effects the halting of work-feed means.
- 262, for work-feed dwell effected by clamping or blocking the moving work, without stopping the motion of the feed means proper, and see (2) Note to subclass 225.
- 227** This subclass is indented under subclass 226. Device wherein the work-feeding means is itself mounted on the tool or tool support.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 218, for a device wherein a tool feeds the work while still in contact therewith during a cutting stroke.

- 228, for supplemental work-feed means carried by a tool or tool support.
- 228** This subclass is indented under subclass 226. Device which includes a plurality of work moving means acting in succession, each such means being capable of moving the work through a portion of the required feed increment, one of said feed means itself mounted on or integral with the tool or tool support.
- (1) Note. Pilot pins which serve to correct the position of slightly misplaced work are included, if carried by the tool support.
- (2) Note. The supplemental work-feed means may be provided merely to correct slight misplacements of the work if an when they should occur.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 218, for a tool which has work-feeding motion (the tool feeds the work after engaging it with a cutting stroke).
- 229** This subclass is indented under subclass 226. Device wherein the tool-mounted means is brought into operation during the tool's motion away from the work.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 223, for work advanced by release of potential energy accumulated during and as a result of tool movement (such work advance may occur during return movement of tool).
- 257, for the general case of work advance during return stroke of tool.
- 230** This subclass is indented under subclass 225. Device in which the means mounted on tool or tool support is effective at some point in its travel to cause stopping of the work moving means.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 221, for interlock means to prevent movement of work-feed means except in certain positions of tool.
- 262, for dwell caused by clamping or blocking the work, where work-feed means is continuously driven.
- 268+, for dwell caused by blocking the work by an abutment (which may be carried on or moved by the tool support).
- 282, for (broadly) clamping work during dwell.
- 391+, for interrelated actuation of tool and work-stopping abutment.
- 231** This subclass is indented under subclass 202. Device in which the work engaging and moving element, or a portion of the work-feed means driving train which is not common to the latter and to the tool driving train, and which moves without producing any corresponding motion of the work, is itself, or carries means which is, effective to drive, or to establish a power connection for driving, the tool feeding mechanism.
- (1) Note. Tool feed may be initiated substantially simultaneously with arrival of the work-feed mechanism at the end of its feed motion, where it appears that the tool is not intended to engage moving work.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 221, for interlock between work-moving and tool-moving mechanisms.
- 225+, for work moving means controlled by means on tool or tool support.
- 273+, for intermittent drive type of gearing for work-feed means.
- 399+, for a device in which an element common to the control or actuation of work moving and tool actuating means is arranged to initiate or permit actuation of one means while preventing actuation of the other means.
- 232** This subclass is indented under subclass 231. Device in which the feeding element or driving portion delivers an impact to an element which causes a cutter to start its cutting stroke.
- (1) Note. Such organizations are common in machines for delivering tape, which often are used to feed and cut only a single length or strip of tape at each use, but

may be used to deliver as many lengths at a time as desired.

- (2) Note. For machines having positive stop mechanisms requiring reinitiation of the mechanism after each cutting cycle, see subclass 203 supra.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

203, and see (1) Note above.

- 233** This subclass is indented under subclass 232. Device in which the nonfeed motion is in a direction opposite to that in which the feeding element or driving portion moves when bringing about a feeding movement of the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

399+, for interlocking relationship between work and tool movers, some of these devices permit tool actuation only upon reversal of position of a work-feed lever.

- 234** This subclass is indented under subclass 202. Device having means to permit a change in the number of stops and starts of the work-feed means between successive actuations of the tool actuating means, without necessitating the replacement of any machine part to bring about the change.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

57, for manually actuated means to disturb cyclic operation.

209+, for work-sensing means to control work-moving or work-stopping means.

232+, for a manually operated to feed more than one increment of work for any one cutting cycle, at the discretion of the operator.

238+, for unequal work-feed increments in recurring series.

241+, for means to vary magnitude of work-feed increment.

242+, for multiple-length feed.

250+, for means to produce a plurality of work-feed increments per tool cycle.

- 235** This subclass is indented under subclass 202. Device wherein means is provided to bring a portion of the work adjacent a tool station alternately to a halt and to a condition of forward motion by imparting to that portion of the work a succession of alternate backward and forward movements while the remainder of the work is undergoing continuous forward movement.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

236, for uninterrupted advance of work from supply source.

259+, for a device wherein constantly moving feed elements (e.g., rotating feed rolls) are not always in effective engagement with work.

262, for a device wherein work dwell is effected by clamping or blocking the movement of a portion of the work without any provision being made for halting the movement of other portions thereof.

- 236** This subclass is indented under subclass 202. Device wherein transport means moves work continuously into or toward the machine, means being provided to cause or permit temporary halting and/or storage of a portion of the work during the cutting cycle.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

205, for work-feed dwell caused by clamping or blocking the work.

235, for work-feed dwell caused by imposing reverse motion on portion of flexible moving work.

280, for means to transport work to work-feed means.

284+, and 350+, for tool engaging moving work.

- 237** This subclass is indented under subclass 202. Device wherein the tool or an array of tools which are actuated during one dwell period has such extent in the direction of work-feed that cuts made during successive dwell periods overlap or intermingle.

- (1) Note. Devices in this subclass are frequently used to shred or cut small pieces from a web by serrated cutters.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 213+, for possible overlapping cuts made by successively actuated tools.
- 249, for a machine modified to facilitate manual reorientation of workpiece, as when cutting or punching along a curved line.
- 255+, for possible overlapping cuts made at plural tool stations.
- 916, for a nibbling machine.

238 This subclass is indented under subclass 202. Apparatus so organized that the amount of work fed differs from one feeding movement to another, the same amounts being fed in later feed movements and in the same order.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 220+, for means to feed work in certain different directions between tool strokes.
- 250+, for means to produce a plurality of work-feed increments per tool cycle (certain of said increments may be of different extent than others).
- 393, for work-stopping abutment made effective in different positions between successive tool strokes.

239 This subclass is indented under subclass 238. Device including a movable work support and an associated series of detents, to be engaged by cooperating means to stop the travel of the support in accordance with the location of such detents.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 241+, for means to vary magnitude of work-feed increment generally.
- 396, for interrelated tool actuation and means to release work-mover stop.
- 414, for a device comprising indexing means to orient a work carrier relative to a tool station.

240 This subclass is indented under subclass 202. Device wherein means is provided for (a) adjusting the work-feed means to alter the amount fed in each increment, or (b) changing the position of the work relative to the work-feed means, or (c) changing the position of tool

or work-feed means relative to the device as a whole, or (d) changing the location of one or both of the limits of travel of a tool in its cutting or retracting stroke, without necessitating replacement of any machine part to bring about such variation.

- (1) Note. This does not include pattern-controlled adjustments of tool or work-feed, for which see subclass 71, *supra*.
- (2) Note. This does not include temporary disturbance of cycle by manual intervention, for which see subclass 57, *supra*.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 57, and see (2) Note, above.
- 71, and see (1) Note, above.
- 209+, and 211+, for work-moving or work-stopping means controlled by work-sensing means in a machine of subclass 202 type.
- 234, for means to vary number of work-feed increments between cuts.
- 249, for means enabling the shift of work relative to a work-feed means by an operator.
- 252, for means capable of producing an additional work-feed increment by intervention of an operator.
- 268+, for work-feed increment limited or determined by work stop.
- 657, 677, 696, 699.51+, for adjustable tool or tool support.

241 This subclass is indented under subclass 240. Means to vary the length or amount of work fed toward the tool at each one of the series of stops and starts of the work which characterize the operation of a device of the type of subclass 202, without necessitating the replacement of any machine part to bring about such variation.

- (1) Note. This subclass includes adjustment of work-feed by varying the effective length of a link or shape of a cam, where such link or cam is not part of the actual drive to the work-feed means, but is only a control element.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 69, for machine which stops after cutting a predetermined number of products.
 203+, for unicyclic machine.
 208, for work-length-determining means driven by the work (e.g., measuring wheel).
 233, for devices which inherently permit the selection of a length of stock to be cut (within a limit) by feeding the amount desired and then reversing the feed lever to cause cutting to occur.
 234, for means to vary the number of work-feed increments between tool strokes.
 268, for feed limited by work stop.
 399+, for a work-feed actuator or controller which can be manipulated in a direction to lock the work-feed means and permit or cause actuation of a tool.
- 242** This subclass is indented under subclass 241. Device which functions so to vary the work-feed increments that all such increments are whole number multiples of a predetermined base length.
- (1) Note. Examples are ticket-issuing machines.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 234, for feeding of variable multiple lengths in stepwise manner between successive tool strokes.
 250+, for means to produce a plurality of work-feed increments between tool strokes.
- 243** This subclass is indented under subclass 242. Device wherein the actuation of a work-feed-length determining means serves either to drive the cutting device through its cycle or to establish a connection to power means which so drives the cutting device.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 203+, for a unicyclic machine of this type.
- 244** This subclass is indented under subclass 241. Device wherein the length of a work-feed increment may be varied by altering the effective dimension of a crank, link, or lever arm in the drive train of the work-feed mechanism.
- (1) Note. Included here are adjustable lost-motion drive linkages.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 241+, for change of work-feed increment by change in length of a member of a control (not feed driving) linkage.
- 245** This subclass is indented under subclass 244. Device in which the crank, link or lever arm has a motion of revolution in one direction only.
- (1) Note. An oscillatory driving link of this type will be found in subclass 244.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 244, and see (1) Note above.
- 246** This subclass is indented under subclass 241. Device wherein the length of work-feed increment may be varied by altering the contour of that portion of a moving member which transmits or receives force to drive the work-feed mechanism.
- (1) Note. Typical examples of work-feed adjustments included in this subclass are (a) changing the number of teeth used in a mutilated drive gear, (b) removing part of the tooth of a worm gear, (c) two cam segments in juxtaposition on a shaft may be made angularly adjustable relative to each other.
- (2) Note. The adjustable cam or gear must be in the work-feed drive train itself, not merely in a control linkage, for which see subclass 241, *supra*.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 241+, for changing magnitude of work-feed increment by altering the effective shape of a cam or the like in a timing

or control mechanism (not transmitting force to drive the work-feed means), and see (2) Note, above.

247 This subclass is indented under subclass 241. Device wherein a change in amount of travel of the work-feed mechanism is effected by altering the position or location of a normally stationary abutment which cooperates with a movable member in the work-feed mechanism.

- (1) Note. This subclass does not include devices having an adjustable positioned “stop” located on a moving element.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

241+, for an adjustable “stop” carried by a moving element.

244+, for work-feed adjustment by shifting the location of the fulcrum point of a lever in the work-feed drive train.

248 This subclass is indented under subclass 240. Device wherein means is provided for varying the location (in the direction of tool travel) of one or both of the limits of travel of the tool in its cutting or retracting motion.

- (1) Note. Examples are machines which turn out ticket strips - a number of incompletely severed tickets in each strip.
- (2) Note. The variation may be cyclic or randomly controlled.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

74+, for tool adjustment by a monitoring device.

215+, for tool which has additional motion (e.g., repositioning motion) during cycle.

368, for tool adjustment by work-responsive means.

469+, for adjustment of position or travel of carrier for rotatable disc tool.

523+, for tool stroke or positioning adjustments, in general.

249 This subclass is indented under subclass 202. Device which has certain parts modified especially to enable an operator to shift, reoriented

or reposition the work relative to the work-feed means.

- (1) Note. Such machines may permit the angular repositioning of the work about the tool cutting stroke as a center, to enable for example a change in the direction of a row of perforations without introducing an irregularity in spacing where the change is made.

- (2) Note. Means to facilitate loading work into the work-feed means may be included (threading means) if it is disclosed as also usable to readjust the position of work while the machine is in operation.

- (3) Note. Many nibbling machines are found in this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

373, for interrelated tool actuating and work guide moving means.

415, for work carrier having additional work-locating means thereon, which may shift the work on the carrier.

455, for guide adapted to permit maneuvering of work at tool zone.

916, for nibbling machines.

250 This subclass is indented under subclass 202. Device in whose operation the work is caused to undergo more than one advancement and stoppage for each stroke of tool, or is advanced successively by different feed means during one tool cycle.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

111+, for means to clear the freshly-cut edge of product (cut work) from a tool, by moving it relative to the tool, prior to the next work-feed increment, thereby in effect affording a plurality of increments between successive tool strokes.

206, for a work-moving clamp, which follows and supplements an approximate work-feed by hand or mechanical means.

207, for an actuated abutment which can move work to a final position after a

- preliminary feed of work against the abutment.
- 219+, for a machine wherein the work may be caused to move in different directions between successive tool strokes.
- 228, for supplemental work-feed means mounted on tool or tool support.
- 234, for means to vary the number of work-feed increments between strokes.
- 280+, for means to move work into the effective range of work-feed means proper, and see (4) Note under subclass 251 for the distinction between supplemental work-feed means and work transport means.
- 251** This subclass is indented under subclass 250. Device so constructed that work may be moved by more than one feed means acting at different times.
- (1) Note. This subclass includes lateral positioning means, for instance.
- (2) Note. This subclass includes work-feed means which may not be effective in every cycle, such as manually actuated means to correct the registry of the work, either by the provision of additional work-feed means or by provision of additional actuating means for the existing work-feed means.
- (3) Note. The search notes under subclass 250 should be reviewed in relation to this and indented subclasses.
- (4) Note. Supplemental work-feed means, in this and indented subclasses, is capable of and is normally utilized for the purpose of presenting work in correct amount and proper timed relation to the tool station, as distinguished from work transport means which merely forwards work to a work-feed means proper and which lacks the requisite timing or range of stroke to position the work for operation thereon by the tool.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 228, for supplemental work-feed means mounted on tool or tool support.
- 252** This subclass is indented under subclass 251. Device wherein the supplemental feed means is actuated, or the conventional work-feed means is driven through additional motion, by the intervention of an operator.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 203+, for a unicyclic machine in which an operator must intervene to pull the work through a certain distance in order to initiate a cutting cycle.
- 249, for means to facilitate manual repositioning or realignment of work.
- 253** This subclass is indented under subclass 251. Device including a supplemental work-feed means which functions to move the work against a work-stop located for proper placement of the work.
- (1) Note. The supplemental feed increment may be in any direction, but is limited by engagement of the work by a stop.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 207, for work brought into position by an actuated abutment.
- 239, for unequally spaced ratchet stops associates with a work carrier to effect unequal work-feed increments in recurring series.
- 268+, for work-feed against a stop or guide for positioning thereof.
- 254** This subclass is indented under subclass 253. Device provided with means to cause two or more stops to become effective in serial relationship to position the work for successive tool cycles.
- (1) Note. The plurality of work stops are so disposed and/or moved that not all of such stops are brought into work-abutting and stopping position for any one tool cycle and the identity of stops in such position varies cyclically.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 238+, for means to produce unequal work-feed increments in recurring series.

- 278, for some disclosures of work-moving pusher elements which are successively effective.
- 393, for work stopping abutment(s) with cyclic means to alter work-stopping position between tool strokes.
- 255** This subclass is indented under subclass 202. Device having two or more tools disposed along the path of feed movement of work at such locations that each tool operates, in sequence and during different dwell periods, upon the same piece of work or the same feed-wise segments of indefinite length work.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 213+, for plural tools successively actuated in one general cutting zone during the same or different dwell periods.
- 217, for a tool arranged to engage the work a number of times during one dwell period.
- 237, for a machine whose work-feed increment is less than the dimension of a tool array in direction of work-feed, to produce overlapping, continuous, or intermingling cuts by the same tool or array of tools.
- 272, for plural work-feed paths in a cutting machine.
- 404+, for means to feed work from one tool station to another.
- 620, for plural tools mounted on and actuated from same support.
- 256** This subclass is indented under subclass 255. Device in which the work is fed in different directions to the various tools in succession.
- (1) Note. A "change in direction" may be a mere reversal of direction.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 219+, for a machine capable of feeding work in different directions between successive tool actuations.
- 257** This subclass is indented under subclass 202. Device wherein the work-feeding motion is timed to take place while the tool is being withdrawn from the work after its cutting function has been performed.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 218, for a tool which has work-feeding motion in addition to its cutting and retraction motion.
- 229, for work-feed means driven by tool or tool support during return movement of the tool.
- 258** This subclass is indented under subclass 202. Device wherein the work-feed means is driven from a constantly rotating crankshaft through a Scotch yoke or connecting rod with no provision for work dwell other than the momentary halts that occur when the yoke or connecting rod passes through its extreme positions.
- (1) Note. The yoke or rod may drive work-feed rolls through a double pawl-and-ratchet arrangement, whereby the feed is driven at each forward and each return stroke of the pitman (no half-revolution idle period as in a single-ratchet drive).
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 235, for work-feed dwell caused by imposing reverse motion on a portion of flexible moving work, where all machine parts may be in motion during the dwell.
- 259** This subclass is indented under subclass 202. Device which functions to move work by gripping engagement between a surface of the work and a surface of a continuously rotating reciprocating or oscillating member, the dwell being caused by separation of the frictionally engaged surfaces.
- (1) Note. Subclass 260, indented hereunder, includes patents disclosing mutilated feed rolls to cause the intermittent feed.
- (2) Note. This subclass includes feed grippers which during their advancing motion, release the work to effect the dwell as the grippers continue to reciprocate or oscillate between advanced and retracted positions.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 259, for dwell caused by directly clamping or blocking the work.
- 260, and see (1) Note above.
- 269, for slippage of feed means on work, after work has engaged a stop or abutment.

260 This subclass is indented under subclass 259. Device wherein the continuously driven feed member has a frictional work-engaging surface which has been modified, as by cutting away portions thereof, to cause intermittent drive of the work by repeated engagement and disengagement of such surface therewith.

- (1) Note. The dwell is caused by interruption of frictional driving engagement between feed element and work surface.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 246, for work-feed adjustment by changing the effective shape of a driving or driven element.
- 275, for a work-feed means whose dwell is produced by intermittent engagement of mutilated gearing.

261 This subclass is indented under subclass 259. Device wherein the frictional work engaging surface moves continuously in a circular or closed oval path.

- (1) Note. This subclass includes patents disclosing opposed continuously moving feed rollers or feed belts which are alternately moved toward and away from each other to advance and to release the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 235, 262, and 269, for other continuously rotating work-feed means in a machine of the subclass 202 type.
- 284+, for continuously driven work-feed means in a machine of the flying cutter type.
- 350+, for continuously driven work-feed means in a machine wherein no provision is made to stop the work.

436.1+, for a cutting device with a roller to convey work wherein the cut is parallel to and during work movement.

436.3+, for a cutting device with a roller to convey work, generally.

262 This subclass is indented under subclass 202. Device wherein feed means continuously advances the work toward a position where it is acted on by a clamp or an abutment, which stops the movement of the portion of the work in the region of the cutting zone, or wherein the movement of such portion is stopped by the tool itself in its cutting stroke.

- (1) Note. The work usually buckles or compresses during the time the clamp or abutment stop is effective and the tool is actuated.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 207, for work-stopping abutment which also moves the work to its correct position at the tool zone.
- 212, for a work-stopping abutment incorporated in a work-sensing means.
- 230, for clamp or work stop on tool or tool support.
- 236, for work continuously advanced to an intermittent work-feed means.
- 253+, for work-stopping abutment cooperating with a supplemental work-feed means.
- 268, for work driven against a locating stop, by work-feeding mechanism or by the action of gravity alone, in a machine of the subclass 202 type.
- 269+, for a work-stopping abutment which is effective to halt the work while it continues to be biased forwardly by feed means.
- 350+, for tool with stroke transversely of moving work and timed therewith, no provision being made for stopping the work.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, subclass 343 for a conveyor a portion of which dwells at a work station while the conveyor continues to move along other portions of its conveying path.

- 263** This subclass is indented under subclass 202. Device which incorporates means to assure, in connection with each starting or stopping of the work, the feeding or advancement of a predetermined length of work or the confinement of the rate of change of speed of the work to a desired range.
- (1) Note. This subclass does not include adjustment of work-feed increment, as such, for which see subclasses 241+, supra.
 - (2) Note. A work-feed means as defined in this subclass is commonly used, for example, to prevent undesired, accidental, or unauthorized advance of the work during a dwell period, or to assure the full extent of advance of the work at each cycle, or to avoid damage to or inaccurate advance of the work caused by sudden starts and stops of the work-feed means.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
234, 241+, 250+, for feed adjustments.
- 264** This subclass is indented under subclass 263. Device wherein means is provided to prevent the overrunning of a work-feed means or its motion during any part of the cycle other than while it is being driven.
- (1) Note. These devices may be utilized to prevent advance of work by tampering or unauthorized use, as in ticket-issuing machines, or may be used to handle certain kinds of workpieces with greater precision, reduce wastage, etc.
 - (2) Note. If overrunning is prevented by positive drive trains (double-acting cams, etc.), search the pertinent types of work-feeds.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
221, 399+, for an interlock including control of work-feed means.
242+, for a machine characterized by multiple-unit work-feed increments, which usually include means to prevent
- overrun or unauthorized work-feed operation.
- 274, for positive stop during dwell.
416, for a work conveyor and means to stop same.
- 265** This subclass is indented under subclass 263. Device including means to prevent reversal of direction of work-feed means before it has completed a predetermined travel.
- (1) Note. The full stroke mechanism is frequently interlocked with the tool actuating means to prevent premature tool actuation; patents claiming the interlocking feature are originally classified in subclass 221.
 - (2) Note. In addition to its primary function of preventing underfeed of work, full stroke mechanism also prevents the advance of an excessive amount of work by repeated actuation of the work-feed means through partial strokes between successive tool strokes.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
209+, 211+, for specific operations similarly controlled in machines of the subclass 202 type.
221, for interlock between work-feed and tool actuation, and see (1) Note above.
222, for tool actuation tripped by completion of work-feed and vice versa.
360+, for operation controlled by means responsive to work.
416, for means to stop work-mover.
- SEE OR SEARCH CLASS:
74, Machine Element or Mechanism, subclass 17.5 for a full stroke compelling mechanism in general.
81, Tools, subclass 313 for a full stroke compelling mechanism in a plier-type tool.
- 266** This subclass is indented under subclass 202. Device wherein an element of the means which moves the work to the tool zone also supports a tool (i.e., functions as a tool support as defined in the Definitions of terms for the class).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 218, for tool having work-feeding motion.
- 267, for some patents disclosing a tool mounted on a rotary work carrier.
- 322+, for work-feeder mounted on support for flying cutter.
- 566+, for tool which moves work to and against cooperating tool.

267 This subclass is indented under subclass 202. Device provided with means (e.g., an indexing member) to carry the work through at least a portion of a circular path while in engagement with holding means, the work being acted upon by a tool while held on said means.

- (1) Note. The presence of work-clamping means on the rotary member distinguishes it from a feed roll.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 323, for work-feed means carried by orbitally moving tool support, in a flying cutter.
- 325, for work gripper on endless belt work carrier in flying cutter machine.
- 411+, for work carrier guided about axis fixed relative to tool station.
- 439, for means to guide work for pivotal motion about a fixed axis in the vicinity of a tool.

268 This subclass is indented under subclass 202. Device provided with passive means which serve as an obstacle to limit movement of work in a given direction.

- (1) Note. This subclass includes machines wherein the feed means moves the work to an inclined track, where it slides down against a stop, or wherein the work merely drops against such stop after being brought into the vicinity by feed means, or wherein the feed means drives the work against the stop.
- (2) Note. In some cases, the work is caused or permitted to move back against an abutment which positions it for cutting.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 207, for actuated abutment which positions work prior to tool stroke.
- 253+, for work moved against a stop by a supplemental work moving means.
- 391+, for a work-stopping abutment actuated in timed relation to tool stroke.
- 396, for work-mover stop actuated in timed relation to tool stroke.
- 414, for means to stop work-mover, in general.
- 467+, for a work-stopping abutment not claimed as functionally related to a tool.

269 This subclass is indented under subclass 268. Device wherein the feed means continues to move (and slips on the work), upon work contact with a stop element, the frictional driving engagement of the feed means with the work being overcome (interrupted) by the halting of the work in the feeding area.

- (1) Note. Devices found in this subclass provide for slippage of the feed means on the blocked work rather than slippage at some point in the drive train.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 262, for continuously driven feed means and work clamp or stop, with no provision for slippage (work must buckle up or distort).
- 350+, for continuously fed work acted upon by a transversely moving tool, with no provision for slippage (work must buckle up or distort) and work movement is checked only momentarily as an incidental effect of contact therewith of the tool.

270 This subclass is indented under subclass 202. Device wherein a work guideway and feed means are located both at one side of the work path, leaving the other side of the path unobstructed.

- (1) Note. Machines thus modified are capable of operating on a very wide object or strip, also can operate at or near the

periphery of an irregularly shaped object, such as a shoe sole.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 219+, for variable direction of work-feed from cycle to cycle.
- 249, for machine modified to facilitate manual shift or repositioning of work.
- 373, for interrelated tool actuation and work guide movement.
- 445, for work guide adapted to permit manual shift of work relative to a tool station.
- 914, for flash trimmer.

271 This subclass is indented under subclass 202. Device wherein provision is made in the work-feed mechanism to keep it from interfering with or being touched by the moving tool.

- (1) Note. Conveyor belts with openings registering with the tool, belts with loop at the cutting station, etc., are included in this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 266, for tool supported on work-feed means.

272 This subclass is indented under subclass 202. Device including separate feed means for advancing two or more lines of web or stock material, or successions of workpieces along different routes to the same tool or to different tools.

- (1) Note. This does not include separate rolls or belts or sectionalized rolls on common shafts, which feed work in the same general plane or along converging or diverging paths.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 256, for work being fed in different directions to and between a plurality of tools for sequential operations by said tools on the same general areas of the work.

273 This subclass is indented under subclass 202. Device wherein step-by-step work-feed motion is obtained by means of modified rotary gearing which periodically interrupts the flow of power to the feed means during continued rotation of a portion of the gearing.

- (1) Note. This subclass includes only those devices wherein a rotary gear or element rigid therewith drives the work-feed means intermittently.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 241+, for disclosures of work-feed adjustment by altering an effective number of teeth in intermittent gearing which controls, but does not drive, a work-feed device.
- 246, for an interrupted gear drive wherein the effective number of driving gear teeth is adjustable to vary the work-feed increment.

274 This subclass is indented under subclass 273. Device in which the gearing has portions which interrupt the motion of a driven portion thereof and hold it at a standstill for predetermined intervals during the rotation of the driving gear.

- (1) Note. Examples are Geneva stop mechanism, and the "Drunken Worm".

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 264, for means in general, to prevent random or excessive feed movement.

275 This subclass is indented under subclass 273. Device in which the increments of work-feed correspond to toothed portions of the periphery of a rotatable body which cooperates with another toothed rotatable body in the driving train for the work contacting feeding means, and the intervals of time during which the feed means is not driven correspond to untoothed portions of the first named rotatable body.

- (1) Note. In this subclass, the gearing merely periodically interrupts the flows of power to work-feed means, but is not designed to lock the latter in position

during the dwell intervals, for which see subclass 274.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 241+, for adjustable gearing which controls the timing of work-feed drive means but which does not itself drive said means.
- 246, for some disclosures of mutilated gearing in work-feed drives.
- 274, and see (1) Note above.

276 This subclass is indented under subclass 202. Means including a member which engages and advances bodily with the work towards the cutter.

- (1) Note. The work-feed means may reciprocate; i.e., travel along the same path on its return stroke as it traveled in its feeding stroke; or it may return from its feeding stroke along a different path (such as a “four motion” feed, or an endless belt conveyor).
- (2) Note. The work engaging member may undergo a return movement after each feed increment, or after a succession of work-feed increments.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 267, for means to move work step-by-step in an arcuate path said means having no distinct (e.g., reverse) return movement.
- 409+, for other rectilinear work-mover means including a work-constrainer.
- 435.11+, for a cutting device having a rectilinearly moving work carriage and tool adapted to cut parallel to the direction of and during work movement.
- 437.1+, for a cutting device having a rectilinearly moving work carriage and a tool, generally.
- 730, for a cutting device including a rectilinearly moving work carriage and including means to cause the cutting device to make plural passes through a diminishing workpiece, including means to effect incremental movement toward the plane of cut.

277 This subclass is indented under subclass 276. Device including opposed solid members arranged to hold frictionally a portion of the work to draw the work with them and thus present the work to the tool.

- (1) Note. A gripper is a device comprising a plurality of opposed jaws or surface elements relatively movable to engage opposed surfaces of a workpiece and thereby apply sufficient force to enable advancement of the workpiece by said jaws or surfaces through their frictional engagement with said workpiece, i.e., in a direction substantially parallel to the surface elements or jaw faces.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 267, for rotary work carrier comprising work grippers or abutments.
- 276+, for rectilinear or oscillatory feed device which holds work by other than frictional gripping or positive abutting engagement (e.g., suction or magnetic holders).
- 294, 319, 323, 325, for work-feeding grippers in flying-cutting machines.
- 409+, for work-constraining means on workmover.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, subclasses 468.2+ and 470.1+ for a conveyor having load-gripping members.

278 This subclass is indented under subclass 276. Device in which the work-feed means comprises a member which engages in an opening in the work or which positively pushes the work.

- (1) Note. Impaling points or fingers which form their own recesses or openings in the work are included here.
- (2) Note. Push bars and the like which directly engage and push the work are included here. The “abutment surface” engaged by such pusher may be the rear edge of the work as well as any other salient portion.

- (3) Note. A feed member having a rough toothed, or corrugated surface to engage work, if opposed by another moving surface so as to clamp the work, would be classified in subclass 277, but if opposed only by a stationary work-supporting surface or work guide, or by the mere weight of the work itself, would generally be regarded as imbedded in the work or abutting it within the scope of the definition of subclass 278.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 277, and see (1) Note above.
423, for projections on work mover (e.g., pinwheel).

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, subclass 388 and 854+ for a conveyor having a holder that contacts the interior of the conveyed load, subclasses 692+ for a conveyor having load impalers, and subclasses 717+ and others for a conveyor that pushes a load supported on a separate platform.

- 279** This subclass is indented under subclass 202. Device including active or passive means which move or exert control on the work (other than by merely supporting it against gravity) before it reaches the means-to-feed it to the cutting zone.

- (1) Note. The first named means (guiding, positioning, or transport) is not adequate of itself to present the work properly to the tool zone.
(2) Note. The first named means may merely orient or "square up" the work being presented to the work-feed means, or it may control the timing of work presentation to the latter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 236, for means to effect uninterrupted advance of work from supply source to work-feed means.
250+, for means to produce a plurality of work-feed increments per tool cycle.

- 255+, for means to feed work successively to plural tools.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, appropriate subclasses relating to plural conveyors which successively carry a load.

- 280** This subclass is indented under subclass 279. Device which comprises means to carry work from a source of supply and transfer it to the means effective to present the work to the cutter.

- (1) Note. The transport means serves to advance work to the work-feed means proper, but is not adequate in itself to move the work in correct amount and proper timed relationship to the tool station, and is thus distinguishable from a work-feed means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 236, for continuous advance of work to a feeding and cutting machine having work-feed dwell.
250+, for means to produce a plurality of work-feed increments in a tool cycle.

- 281** This subclass is indented under subclass 280. Device which includes mechanism to engage articles, usually one at a time, withdraw them from position in a magazine or stack holder, and present them successively to a work advancing means or to the work-feed means proper.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 417, for such work-picking means associated with other types of tool and work-feeding means.

- 282** This subclass is indented under subclass 202. Device including opposed solid means to contact the halted work and maintain or retain the work frictionally in a fixed position.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 206, for a machine of the subclass 202 type which employs a clamp to move the work into position.
- 259+, 264, 277, for a disclosure of a device having a work clamping function in addition to its primary function of feeding work or controlling the feed of work.
- 262, for a machine whose work-feed dwell is caused by clamping the work.
- 294, 319, 323, for a device to grip moving work in a flying cutter type of machine.
- 375+, for a work clamp actuated by or in timed relation to the motion of a tool or the tool feeding means.
- 452+, for a cutting device having a clamp associated therewith, in general.

283 This subclass is indented under subclass 202. Device wherein the tool is caused to start from rest in a retracted position and travel through its cutting cycle returning to its initial position and to stop there, by automatic clutching and declutching means while other machine parts continue in motion.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 58+, for randomly actuated stopping means, which includes many disclosures of a clutch in a tool actuating drive train, some of these disclosures including a clutch of the one-revolution type.
- 203+, for unicyclic operation of a cutting machine of the type wherein a tool engages the work during the dwell period of an intermittent work-feed.
- 210, 211+, 369, 370+, for tool actuation controlled by work-sensing means.
- 285+, for an intermittently initiated flying cutter action.
- 359, for tool actuation controlled by means responsive to product.
- 380, for sequencing control of interrelated clamp and tool means.
- 484, and 524+, for unicyclic tool actuation.

284

This subclass is indented under the class definition. Device which includes means to move one or more tools into cutting engagement with the work while the work is being moved to and through a cutting zone to produce (a) spatially unconnected, or (b) undulant (e.g., zigzag) cuts, and in which the tool's movement includes, as a necessary factor, motion in the direction of such work movement.

- (1) Note. These devices are commonly known as "flying cutters".
- (2) Note. See section IV, Glossary, of the Class 83 Definition for the definition of "flying".
- (3) Note. The direction of movement of the work, to and through the cutting zone; i.e., feed direction, is determined by the law of operation of the disclosed machine, even though the work-feed means is not claimed. Accordingly, this and the indented subclasses do not require that means to feed the work be claimed. Thus, patents for means to cut manually fed work may be included here if the other requirements of the definition are met.
- (4) Note. This and the indented subclasses are limited to devices which engage the work so that cuts made by the same tool are spaced from each other or produce a nonrectilinear slot or slit. Patents for cutters which continuously engage the work, even though they have a component of motion in the direction of work-feed which has no affect on the resultant cut, such as band knives and rotary disc slitters, will be found in other areas of the schedule. The test is whether the "flying" motion has any affect on the desired shape of cut.
- (5) Note. Since indented subclasses 321+ is limited to patents which disclose a tool having a cutting blade which moves in an orbital path, this subclass, (284) has been chosen as the residual repository for those patents which disclose an orbiting anvil and a cooperating nonorbiting bladed tool, and which do not disclose a

feature set out in the schedule above subclass 321.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 37+, for corresponding methods of cutting.
- 201, for an endless flexible band knife; and see (4) Note above.
- 350+, for a device in which the tool has a stroke which is timed with respect to moving work, which stroke does not have a component in the direction of work-feed at the time of cut.
- 469+, for a rotary disc cutter; and see (4) Note above.

SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclasses 70+, 129+, 185+, and 203+ for a “flying cutter” means in a moving work metal deforming apparatus.
- 82, Turning, subclass 53.1, for a cut-off means having a motion component in the direction of work-feed.
- 101, Printing, appropriate subclasses, for similar apparatus for treating moving work, as by printing or embossing rather than by cutting.
- 234, Selective Cutting (e.g., Punching), subclass 50, for a selective cutting device having flying cutting tools.

285 This subclass is indented under subclass 284. Device wherein there is provided a mechanism which periodically starts a tool from a position of rest, moves the tool to and through the work, and brings the tool to rest for a dwell period.

286 This subclass is indented under subclass 285. Device provided with a detector* for work, a transmitter*, and means to initiate or effect a tool action as a direct or indirect result of the receipt by said means of a detected and transmitted signal or impulse.

- (1) Note. For convenience in terminology, in this and indented subclasses, the compound movement of a flying tool will be referred to in terms of two components, one being the tool “flying movement” (defined in the Glossary for the class), and the other being the tool “feed movement)” (defined as that component of motion directed only toward the work,

i.e., toward the other tool of a tool pair). The distinction between the named components is not an arbitrary one; in the schedule, and in the placement of patents, components are significant as to those patents which disclose separate actuating means to give the tool its respective flying and feed movements. Thus a patent to a rotary cutter of the “lawnmower” type (such as is found, per se, in subclasses 331+ below) and including work-responsive tool actuating means, will be found in a generic subclass such as 290 rather than in a subclass characterized by the type of feed or flying movement such as subclasses 291 or 292, respectively.

- (2) Note. Included in this subclass (286) are patents disclosing tools revolving about a fixed axis (e.g., lawnmower type), which tools are actuated by a mechanically operating detector and transmitter. For similar structure wherein the detector is a photocell, see subclass 289; and wherein it is otherwise part of an electrical circuit, see subclasses 290+, indented hereunder.

- (3) Note. For other subclasses providing for work-sensing mechanism and control means responsive thereto, see subclasses 399+ under the heading “Search This Class, Subclass”.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 308+, for patents in which the flying component of the tool's motion is derived entirely from the engagement of the tool with the moving work.

287 This subclass is indented under subclass 286. Device provided with means to alter the dimension of the product in the direction of work movement.

- (1) Note. For the purpose of this subclass, the length of a product is that dimension defined above regardless of the magnitude of that dimension relative to other dimensions; thus, as to this subclass, the length of a product may be smaller than

the width thereof if short pieces are cut from relatively wide work.

- (2) Note. Examples of the means defined above are means to effect (a) variation of the position of the work sensor relative to the cutter and (b) variation of the time elapsed between the sensing of work and the initiation of the tool action in response to said sensing.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 363, for other product length changing apparatus responsive to work-sensing means.

288 This subclass is indented under subclass 287. Device provided with means to alter the longitudinal dimension of the first product cut from a workpiece with respect to the longitudinal dimension of the remaining products cut from the same workpiece.

- (1) Note. The work "crop" is an art term referring to that end portion of a workpiece which is so irregular in contour or composition as to be considered waste material. To produce regular sheets from a rolled slab, for instance, waste or "crop" may be trimmed from the leading and/or trailing end of the slab, the intermediate cuts producing the usable products which are usually of longer dimension than the crop and of similar dimension as between successive usable products.
- (2) Note. Included herein are patents also disclosing means to change the length of intermediate products so that a short trailing "crop" end may be cut.

289 This subclass is indented under subclass 286. Device in which the detector includes a means responsive to light to energize an electrical circuit, and the detection of work is effected by a change in the quantity or quality of the light received by said means either directly (as by work's moving between said means and the source of said light), or indirectly (as by reflection from the work).

- (1) Note. Examples of the means referred to above are vacuum tubes and other light-sensitive detectors.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 72+, for a photoelectric work sensor in a "self-regulating" device.
- 365, for other apparatus responsive to photoelectric work-sensing means and see Notes thereto.

SEE OR SEARCH CLASS:

- 250, Radiant Energy, subclasses 200+, for photocell detector and circuit.

290 This subclass is indented under subclass 286. Device in which the transmitter includes an electrical circuit to initiate cutter action, and in which the detector includes a make-break portion in said circuit.

- (1) Note. Contact of the work with the trip switch may be either direct, or indirect, as by engagement of the work with a lever or linkage connected to the trip switch.
- (2) Note. Included in this subclass (290) are patents disclosing rotary flying tools of the type classified in subclasses 331+, which tools are actuated by a trip switch.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 372, for other operating means responsive to trip switch work-sensing means.

SEE OR SEARCH CLASS:

- 200, Electricity: Circuit Makers and Breakers, subclasses 61.13+, 61.19+, 61.41, and 61.42+, for a detector switch, per se.

291 This subclass is indented under subclass 290. Device including a cutter having a means for accomplishing its feed movement, separate and distinct from a means for accomplishing its flying movement, whose feed movement (at least) is started by the work-responsive detector and transmitter.

- (1) Note. See (1) Note to subclass 286 for definition of the terms “feed movement” and “flying movement”.
- 292** This subclass is indented under subclass 291. Device in which the actuation of both (a) the means for accomplishing flying movements, and (b) the means for accomplishing feed movement, is initiated by the same signal or impulse.
- 293** This subclass is indented under subclass 286. Device provided with a cutter having a means for accomplishing its flying movement, separate and distinct from a means for accomplishing its feed movement, whose flying movement (at least) is started by a work responsive detector and transmitter.
- 294** This subclass is indented under subclass 293. Device provided with means, connected to and traveling with the cutter and/or its support, to firmly secure the work to the support for the period during which the work is moving and the tool is cutting.
- (1) Note. Included herein are patents disclosing devices wherein a work-responsive flying gripper is actuated to secure the flying support to the moving work, thus effecting flying movement of the cutter. Also included herein are patents disclosing work-responsive mechanism to actuate concurrently a driving means for the flying movement of the tool and a work gripping means.
- 295** This subclass is indented under subclass 293. Device including means responsive to the speed of the work or of the work-moving means for regulating the speed of the means for accomplishing flying movement of the cutter.
- 296** This subclass is indented under subclass 285. Device provided with means for changing the number of occurrences of tool-action-starting with respect to either a given duration of time or to the passage of a given amount of work past the tool.
- (1) Note. Patents disclosing the adjustment defined above may disclose that this adjustment is for the purpose of changing the length of product cut from the work.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 287+, for work-responsive means to vary length of product of a “flying” cutter.
- 369, for work-driven measuring means to cut different product lengths, in general.
- 297** This subclass is indented under subclass 296. Device in which the means to vary the frequency of the tool-action-starting mechanism includes at least two means, one of said means comprising an element which, when activated, effects the initiation of the tool action, the other of said means comprising a plurality of pin members moving in a closed path, one or more of which pin members along the closed path may be selectively positioned so as to describe a second closed path (parallel to the first named path) which intersects the location of such element at the selected position(s) along the first named path, whereby the positioned pin member(s) will intermittently or periodically engage and move, or otherwise activate, the element in the desired frequency of occurrences.
- (1) Note. The positionable pins may be mounted on a wheel or endless chain for movement in the first named closed path, and any selected pin may be shifted into the second closed path either manually or by mechanical means.
- 298** This subclass is indented under subclass 284. Device in which both the work-feed means and the means to move the tool through a cutting action or cycle are provided with independent power trains, each of which trains has a speed changing means which is adjustable to vary the speed of its driven element (tool or work respectively), and a common mechanism is provided to interdependently regulate the several speed changers so that an adjustment of one will be accompanied by an adjustment of the other.
- (1) Note. A mere common drive does not fall within the meaning of this subclass, and will be found below; e.g., in subclass 339.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 311, for a device to regulate the tool speed of flying cutters.
- 312+, for a device to regulate the work-feed of flying cutters.
- 339, for interconnected work-feed and cutter drives, and see (1) Note above.
- 299** This subclass is indented under subclass 284. Device wherein means is provided to change the lapse of time between the initiation of one tool cycle and the initiation of a subsequent tool cycle and which at the same time maintains the flying speed of the tool the same as it was before the change was made.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 311, for a device which merely regulates the tool speed of a flying cutter.
- 324, for means to vary the tool speed cyclically.
- 300** This subclass is indented under subclass 284. Device wherein more than one flying cutter is provided, and one of the cutters makes a cut in the work which is different from the cut made on the same work by the other cutter or cutters.
- (1) Note. The difference in tool structures is not merely one dimensional extent.
- (2) Note. Included herein, for example, are flying cutters which sequentially punch and cut off the work.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 303, for plural separately mounted flying cutters which may make similar cuts in the work.
- 301** This subclass is indented under subclass 284. Device wherein there is provided both a cutter of the type defined in subclass 284 and a cutter of this class not falling within that definition.
- 302** This subclass is indented under subclass 301. Device wherein the other cutter makes a continuous cut in the work through its thickness in a direction which is substantially parallel to the direction of movement of the work.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 408, for means to move the work between a slitting station and a transverse cutter station.
- 425+, for a slitter, per se.
- SEE OR SEARCH CLASS:
- 242, Winding, Tensioning, or Guiding, subclasses 525+ for longitudinal slitting of material being wound.
- 303** This subclass is indented under subclass 284. Device wherein more than one tool of the type defined in 284 is provided and the tools are independently supported for separate operation in the device.
- (1) Note. Included, for example, are two rotary flying cutters, each rotated at a different speed, and each operating on a different portion of a web which has been slit into two portions.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 300, for plural diverse flying cutters.
- 304** This subclass is indented under subclass 284. Device wherein the tool is cyclically operated, and wherein a means is provided to permit or prohibit cutting during the cycle.
- (1) Note. A tool pass (as applied in the title and definition of this and indented subclass) refers to a sweep of the tool along with the work and including both its flying motion and whatever feed motion is present. A pass may be rendered ineffective to cut the work by a change in tool motion (either in its flying or feed movements), or by a change of work-feed motion, or both.
- (2) Note. Patents disclosing operator actuated means to render a tool pass ineffective will be found here.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 57, for a device in which the cyclic operation of the cutter is stopped by an

- intervening force and is resumed upon release of the force.
- 306+, for a device in which the work is shifted laterally into the path of the cutter to effect a cut.
- 305** This subclass is indented under subclass 304. Devices wherein means is provided to cause a cutter to make a plurality of passes at the work in the direction of work-feed, and the said means causes the work to be cut in certain of the passes and not to be cut in other passes according to a predetermined pattern.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 304+, for a flying cutter having manually operated means to render a cutter pass ineffective.
- 306+, for a work shifter which deflects the work out of a noncutting feed path into the path of the tool.
- 528, for a device having means to move a tool away from the cutting plane while the tool continues to cycle.
- 306** This subclass is indented under subclass 284. Device wherein is provided a means at or near the cutter which bodily moves the work at an angle to the existing direction of work-feed, into and out of the path of the cutter.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 304, for a flying cutter combined with means which are manually operated to render a cutter pass ineffective.
- 307** This subclass is indented under subclass 306. Device wherein sensing means responsive to advancing work causes the actuation of the work shifter.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 286+, for a device to initiate the tool action in response to a sensing of the work.
- 399+, and the Notes thereunder for the loci of other patents disclosing a device actuated by a work sensor.
- 307.1** This subclass is indented under subclass 284. Device wherein the flying cutter is an elongated member having a diameter which is relatively insignificant as compared to its length, which member enters the work in a direction perpendicular to the axis of the member and produces a severance of the work without any appreciable flow of material.
- (1) Note. Because of the “planeless” nature of wire cutters, devices embodying such cutters have structural and operational features peculiar only to such devices. Such features (e.g., wire guides, tool infeed means) will be found in this subclass.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 200.1, for a cutting device which operates by increasing the tension on a work-enclosing wire.
- 651.1+, for a wire, cutting tool, per se.
- 307.2** This subclass is indented under subclass 307.1. Device wherein the wire tool is mounted on a tool support, which support moves back and forth in a direction parallel to the direction of the moving work.
- 307.3** This subclass is indented under subclass 307.2. Device wherein the tool support, in addition to its reciprocating movement, also rotates the tool about an axis which is parallel to the direction of movement of the work.
- 308** This subclass is indented under subclass 284. Device wherein means is provided to move the tool or a member connected to the tool into contact with or in the path of the moving work, so that the tool or member is moved (e.g., dragged or pulled) along by the work at the same speed as the work, and this contact is the sole motive force which moves the tool in the direction of work-feed at the time of cutting.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 222, for a tool of the type there classified in which the tool motion initiates work-feed and vice versa.
- 309** This subclass is indented under subclass 308. Device wherein the tool is resilient, and wherein the tool gives or bends in the direction of work-feed when it contacts the work and

springs back to a ready position when disengaged from the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

542, for means to move or permit movement of tool through cutting cycle by deforming a resilient tool or tool support.

310 This subclass is indented under subclass 284. Device wherein there is provided adjacent the cutter a holding or confining element for the work, and this element moves coincidentally with the cutter in the direction of work-feed during the cutting cycle to carry the weight of the work or steady it.

(1) Note. The flying supports classified in this subclass are often used when delicate or fragile material such as paper straw tubes are cut.

(2) Note. The devices in this subclass are distinguished from the devices in subclasses 319, 322, and 325 below in that the latter not only guide or support the work against gravity, but also positively move the work in feed direction.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

319, and see (2) Note above.

322, and see (2) Note above.

325, and see (2) Note above.

373, for other types of tools having interrelated tool feed and work guide moving means.

311 This subclass is indented under subclass 284. Device including means to vary the flying speed of the cutter.

(1) Note. Devices which increase the flying speed of rotary cutters by increasing the effective radius of the cutters are not here but in subclasses 331+ below.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

38, for a method of cyclically varying the tool feed.

295, for means controlling flying speed dependent on work speed.

298, for interrelated control of work-feed and tool speed.

312+, for a device having work-feed speed regulation.

331+, and see (1) Note above.

312 This subclass is indented under subclass 284. Device wherein means is provided to vary the rate at which the work is advanced to the cutter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

263+, for means to control the magnitude or acceleration of work-feed to the type of tool there classified.

298, for a device having interrelated controls for varying both cutter and feed speed.

429, for means to effect difference between rate of work-feed and speed of a non-flying tool in continuing contact therewith.

313 This subclass is indented under subclass 312. Device wherein means is provided to change the rate at which the work is advanced during each cycle of the tool.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

38, for a method of cyclically varying the work-feed.

324, for means to cyclically vary the tool speed of an orbitally moving tool.

314 This subclass is indented under subclass 284. Device which includes a resilient or elastic element connected to the tool or its supporting structure to resist movement in a work-feed direction, and which element urges the tool back to its initial position after the work has been cut.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

582+, for a constantly urged (e.g., spring biased) tool or tool support.

315 This subclass is indented under subclass 284. Device in which the tool or its support is mounted on a member which is pivoted to swing back and forth, along the path of work movement about such pivot as an axis.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 258+, for the type of cutter there classified wherein the feed means has an oscillatory motion.
 491+, for a rotatable disc cutter on an oscillating standard.
- 316** This subclass is indented under subclass 315. Device in which two tools cooperate to produce a cut, and the tools are mounted on the same pivoted flying member so as to oscillate about the same point.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 320, for plural tools mounted on the same rectilinearly shuttling carrier.
- 317** This subclass is indented under subclass 316. Device in which one of the cooperating tools is pivotally mounted to move independently on the oscillating flying member on the backward movement of such member so as not to engage the work on the backward movement of the flying member.
- 318** This subclass is indented under subclass 284. Device which includes a means on which the tool or its support is mounted, and which means is caused to travel back and forth in a straight line path adjacent the path of the work-feed, and wherein the cutting tool is caused to move cyclically into and out of engagement with the work during its forward travel to cut the work.
- 319** This subclass is indented under subclass 318. Device in which there is means other than the tool to temporarily fasten the work to the carrier during the movement of the carrier in the work-feed direction.
- (1) Note. The clamping may be effected by a member which serves as an anvil in the cutting operation or by a part of a tool other than the cutting edge.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 186, for means to secure hollow work to a movable tool support.
- 308+, for a flying cutter in which the flying motion of the tool is derived solely by its contact with the work.
- 310, for a flying work support or guide.
- 320** This subclass is indented under subclass 318. Device in which two tools cooperate to produce a cut and both are mounted on the same carrier.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 316+, for a device in which both tools are mounted upon an oscillating standard.
- 321** This subclass is indented under subclass 284. Device wherein the cutter blade travels in a closed loop.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 201, for an endless flexible band knife which travels in a closed loop and continuously engages work.
 331+, for a cutter which travels in a circular path.
- 322** This subclass is indented under subclass 321. Device wherein the cutter support, or means mounted on the cutter support advances the work through the cutting zone or holds the work while it is being cut.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 225+, for work-feed controlled by means mounted on the tool or tool support where the tool engages the work during a dwell on intermittent work-feed.
- 323** This subclass is indented under subclass 322. Device in which the work-feeder includes means to grasp or hold the work immobile with respect to the feeder.
- 324** This subclass is indented under subclass 321. Device including means to change the peripheral speed of the cutter during a portion (only) of the tool cycle.
- (1) Note. This feature is ordinarily utilized to enable changes in the length of the workpiece to be cut off, without necessi-

tating changes in speed of work-feed or other major adjustments.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

38, for methods of varying the tool and/or work-feed cyclically.

313, for means to vary the work speed cyclically.

325 This subclass is indented under subclass 321. Device in which a continuous belt includes or has cooperating therewith a means to grasp the work and advance it.

(1) Note. Included in this subclass are devices having two feed belts clamping the work between themselves in order to advance the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

322+, for a tool carried work-feeding clamp.

326 This subclass is indented under subclass 321. Device in which the tool or its support is mounted on a flexible, continuous, closed loop structure.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

661, for an endless band or belt-type tool, per se.

788+, for an endless flexible band knife machine.

327 This subclass is indented under subclass 321. Device wherein there is provided a mechanism which moves the cutting tool in a curved path immediately before, during and immediately after its work cutting operation and, at all times during this operation, maintains the tool in planes which are parallel to each other.

328 This subclass is indented under subclass 327. Device wherein a pair of tools coact with each other to cut the work.

329 This subclass is indented under subclass 321. Device wherein the tool is a relatively thin member of generally circular cross section mounted to rotate about an axis extending thickness-wise therethrough, and wherein

means is provided to move the axis in an orbital path.

(1) Note. Included in this subclass are tools having saw-toothed or serrated peripheral edges.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

425+, for a rotary disc cutter in combination with means to move work thereto, and whose axis does not itself have an orbital motion.

469+, for a rotatable disc tool pair (or tool and carrier) whose axes (or axis) do not have an orbital motion during the cutting operation.

330 This subclass is indented under subclass 329. Device wherein the disc is journaled to rotate about its axis, but no power means is provided to effect such rotation; any rotation which does not take place is due solely to the engagement of the cutter with the work.

331 This subclass is indented under subclass 321. Device in which the cutter blade tool is mounted on an axis of rotation to travel in a circle about such axis.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

315+, for a cutter which oscillates back and forth in an arc of a circle.

321+, for a cutter which travels in a closed loop which is not a circle and see the Notes thereof for search references.

SEE OR SEARCH CLASS:

30, Cutlery, particularly subclasses 205+, 240, 276, 292, 307, and 319 for rotary cutters of the type there classified.

332 This subclass is indented under subclass 331. Device in which the tool has an annular cutting edge which extends around only a portion of the circumference of the tool support, and which edge extends in a plane parallel to the direction of work-feed.

(1) Note. Rotary punches; i.e., tools having a plurality of punches mounted around the periphery of the tool support have not been considered as slitters or slotters

for this subclass, but have been classified in other subclasses under 331 on the structure claimed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 425, for a rotatable disc tool in combination with means to move work thereto, which tool cuts a continuous slit or slot in the work as the work is fed past the cutter.
- 469+, for a rotatable disc tool pair or tool and carrier.
- 676, for a rotatable disc tool, per se.

333 This subclass is indented under subclass 331. Device provided with a cutter including a cutting edge on the periphery of said cutter, in which a development (in the sense of the term as used in descriptive geometry) of the cutting edge from said periphery into a plane forms a zigzag or sinuous line.

- (1) Note. Included herein are rotatable circular cutters known in the art as “pinkers”, “pinking wheels” and “pinking machines”. The terms are so well known that the shape of the edge as defined above is rarely recited precisely; hence mere recitation in the claim (s) of such art terms or similar terms is considered sufficient for classification herein.
- (2) Note. Patents in which the cut is of the form known as “scalloped” will also be found herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 428, for a device which produces an undulant cut by reciprocating a slitting blade laterally of the direction of work-feed.
- 918, for pinking digest.

334 This subclass is indented under subclass 331. Device in which means is provided to cause a cutter to start from a position of rest, rotate sufficiently to cause one cutting operation to take place, and then assume a position of rest.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 203+, for a unicyclic operation where a tool engages work during a dwell feed.
- 285+, for a device to intermittently cause a tool action of a flying cutter to be initiated.
- 484, for a unicyclic operation of a rotary disc slitter.
- 524+, for a unicyclic cutting machine in general.

335 This subclass is indented under subclass 334. Device wherein means is provided to cause the tool to rotate substantially 360 degrees during the single cutting operation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 69, for a device for stopping a cutting tool after a predetermined number of cutting cycles.
- 283, for a one revolution clutch drive mechanism in a device in which the tool engages the work during a feed dwell.

336 This subclass is indented under subclass 331. Device wherein means is provided to shift or flex the work in a direction generally normal to the direction in which it is fed to the cutter, said means acting on the work intermediate the supply source of the work and the cutting zone of the machine; e.g., so as to vary the amount of work fed to the cutter without changing the speed of the work-feed means.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 236, for a loop former in the type of cutting apparatus there classified.
- 350+, for incidental buckling of work during cutting.

337 This subclass is indented under subclass 331. Device including means to effect a supplemental movement of the tool, other than that of rotation about its axis, during the cutting cycle.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 185+, for a tool, inside hollow work, which tool or a second tool coating there-with has compound motion.
- 327+, for a tool having compound motion, which motion keeps the tool constantly oriented in a plane maintained by the tool at all other times during the cutting operation.
- 557, for cooperating cutters having a cyclic movement into and out of operating position in addition to their tool stroke.
- 338** This subclass is indented under subclass 337. Device in which means is provided to move the cutter, during its rotation, back and forth in the direction of its axis of rotation.
- 339** This subclass is indented under subclass 331. Device wherein means is provided to feed the work to the cutting means, and said two means are connected to each other by a power train so that they both may be driven from a single power source.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 231+, for a device in which the means to feed the tool during a dwell in the work-feed is controlled by the work-feed mechanism.
- 298, for interrelated control of tool and work-feed drives, and see (1) Note to that subclass (298).
- 340** This subclass is indented under subclass 331. Device in which the cutter is a spiral blade mounted on an axis of rotation, which axis extends in the direction of work-feed, so that the cut proceeds inwardly from the side of the work.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 342, for a helically mounted cutter making a progressive transverse cut in which the axis of the cutter is transverse to the direction of work-feed.
- 672, for a helical cutter, per se.
- 341** This subclass is indented under subclass 331. Device wherein means is provided to begin the cut at one edge or point of the work and thereafter continues along the work in a straight line, in a direction which is not parallel to the direction of the work-feed, to a different edge or point.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 595, for means to effect a progressive cut of a revolving tool moving through a recess in a work holder or in a cooperating tool.
- 596, for means to effect a progressive cut of a revolving tool.
- 342** This subclass is indented under subclass 341. Device in which the cutter is mounted spirally around its axis of revolution.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 340, for a helically bladed tool whose axis extends in the direction of work-feed.
- 672, for a rotatable helical tool, per se.
- 343** This subclass is indented under subclass 331. Device which includes a second edged cutting tool, or other coating surface (e.g., anvil), mounted on an axis of rotation to travel in a circle, which axis is parallel to the axis of rotation of the first tool, and wherein the first tool and the second tool or other coating surface together effect the cutting action.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 505+, for a tool pair comprising a rotatable disc tool and a cylindrical anvil.
- 509+, for a tool pair comprising a rotatable anvil and a fixed tool.
- 659, for a rotatable anvil tool, per se.
- SEE OR SEARCH CLASS:
- 492, Roll or Roller, see section III, References to Other Classes, of the Class 492 definition, for the loci of other roll pairs with working surfaces.
- 344** This subclass is indented under subclass 343. Device having means to adjust, move or permit movement of the axes of rotation of the cooper-

ating tools toward or away from each other in order to vary the distance between the tools.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

495+, for a rotatable disc tool pair including means to adjust there between.

663+, particularly subclass 677 for a rotary tool adjustable with respect to their supports.

345 This subclass is indented under subclass 343. Device in which cutting members mounted on each of the two axis of rotation interdigitate with respect to each other.

346 This subclass is indented under subclass 343. Device in which the backup has a smooth faced surface that is engaged by the cutter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

659, for a rotatable anvil, per se.

347 This subclass is indented under subclass 346. Device in which the facing of the backup is made of elastic or yieldable material.

348 This subclass is indented under subclass 343. Device in which means is provided to continually urge, as by a spring, one of the tools which may be a coacting surface with respect to its mounting, or to continually urge the mounting of such tool with respect to another tool mounting to effect cutting cooperation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

345, for cooperating rotary cutters which overlap each other during the cutting operation.

506, for a disc blade and cylindrical anvil cutting couple resiliently urged together.

349 This subclass is indented under subclass 331. Device wherein the rotary cutter coacts with a cutter fixed in position to cut the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

355+, for similar art where the rotary tool does not have a component of motion

in the direction of work-feed during the cutting operation.

509+, for a tool pair comprising a rotary anvil and fixed type cutter.

350 This subclass is indented under the class definition. Device including a tool which is actuated in synchronism with advancing work, to cut such work while the latter is passing through the tool station; the tool, during its passage through the work, following a path which is substantially perpendicular to the direction in which the work is moving.

(1) Note. The portion of the work near the cutter may be blocked thereby during and incidental to the cut, causing a buckling or compression of the work. If, however, a patent contains a definite teaching that a dwell is caused in the work motion, such patent will be placed in subclasses 202+, particularly subclasses 262+. Usually the tool stroke* is rapid, and the work springs or falls back to its normal condition between tool strokes.

(2) Note. For a patent to be placed as an original copy in this and indented subclasses, it is not necessary that a work-feed means be claimed if it is evident (from the claimed subject matter) that work is in motion and that a definite timed relationship exists between the work motion and the tool actuation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

202+, for a device in which a tool engages work during the dwell period between successive increments of work-feed, and subclass 262, indented thereunder, for a device wherein work-feed means is operated continuously, but the work is halted during cutting by engagement therewith by a clamp, abutment, or the tool itself, and see (1) Note, above.

284+, for tool having motion component in direction of moving work, and in particular subclass 349, indented thereunder for rotary transverse cutter with axis offset from work-feed path.

401+, for a device to move work toward a tool station.

SEE OR SEARCH CLASS:

234, Selective Cutting (e.g., Punching), subclass 49, for a selective cutting device which operates on moving work; and subclass 50 for such a device with flying cutters.

351 This subclass is indented under subclass 350. Device in which a work-feed means acts during the tool stroke upon a portion of the work spaced from the tool and in a direction not intersecting the cutting zone, whereby the work is caused to pivot about the portions thereof which are successively engaged by the tool, to effect a generally curved or irregular line of cut.

- (1) Note. The action is similar to that of an operator using a pair of scissors to cut a curved piece out of tin or cardboard.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

71, for a cutting machine controlled by a perforated record.
 215, for a machine of intermittent work-feed type wherein a tool has motions additional to its cutting stroke.
 353, for a tool traveling laterally across a moving web.
 411, for means to guide a work carrier about a fixed axis relative to a tool station.
 439, for a work guide which permits rotation of the work about a fixed axis.
 565, for tool motion (usually other than rectilinear) controlled by a templet.

352 This subclass is indented under subclass 350. Device provided with work-carrying structure which is drivingly connected to tool-actuating means so that movement of the work-carrying structure transmits power from itself to a tool to cause the latter to cut the moving work.

- (1) Note. One tool is sometimes fixed to the work support, and a cooperating tool moved by linkage connected thereto.
 (2) Note. The concept of this subclass is distinguished from that of a “flying cutter” by the fact that here the work may be at rest in the cutting zone at the start

of the operation. Thus the actuated tool of this subclass may have a component of motion in the direction of the moving work.

- (3) Note. The work-carrying structure constitutes or is part of work-moving means, hence is distinguishable from a “work-responsive” detector or sensing means, for which see subclasses 360+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

284+, for a tool which has a component of motion during cutting in the direction in which the work enters the cutting zone.
 360+, for operation controlled by means responsive to work.
 409+, for other work-carrying structure.

353 This subclass is indented under subclass 350. Device wherein the tool is of small dimension relative to the dimension of the work in the direction of the tool stroke, and the tool progresses along the moving work in an edge-to-edge direction thereof.

- (1) Note. This type of movement usually produces a bevel or bias cut.
 (2) Note. The relatively narrow tool offers little resistance to feeding movement of the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

483+, for a rotatable disc type of tool traveling from edge to edge of work.
 614, for a reciprocating tool which travels from edge to edge of a sheet or web.

354 This subclass is indented under subclass 350. Device provided with means to change the time interval between any two successive cutting strokes with respect to the length of work fed during such interval, without the necessity of replacing any machine parts to effect such change.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

240+, for adjustable tool or work-feed in machines of the step-by-step intermit-

- tent feed type, and subclass 234 for varying the number of work-feed increments per tool stroke.
- 287+, 296, 304, 305, and 313, for adjustment of work or tool feeding flying-cutting machines.
- 355** This subclass is indented under subclass 350. Device including means which constantly transmits power to actuate the tool continuously through repeated strokes during continued movement of the work.
- (1) Note. A cam-driven tool would satisfy the limitations of the definition of this subclass only if no dwell period occurs during the camming cycle. (A dwell period implies interruption in the flow of power to the tool).
- (2) Note. Examples of tool actuation to be found in this subclass are (a) simple rotation, (b) tools driven with simple pendulum motion, (c) reciprocating tools driven in substantially simple harmonic motion, as by a Scotch yoke, an eccentric, or a conventional rotary crank and connecting rod.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 315+, 318+, and 321+, for a tool which is actuated in an oscillatory manner so as to operate on moving work while periodically moving along with the work (flying cutter).
- 331+, for a rotary cutter arranged to travel with moving work during the cutting operation (flying cutter).
- 591+, for a tool having simple rotary motion throughout its stroke or cutting cycle.
- 356** This subclass is indented under subclass 355. Device in which either the tool or the work is shifted between cutting operations in a regularly recurring manner, and in a direction transverse both to the tool stroke and the main direction of work-feed.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 215+, for a machine wherein a tool has motion additional to its tool stroke during a cutting cycle.
- 220+, for a machine in which the work may be advanced in different directions between successive operations of a tool.
- 249, for a machine having work-feed means arranged so as to facilitate manual shifting or reorientation of work between successive tool strokes.
- 356.1** This subclass is indented under subclass 355. Device including a plurality of tools, which tools act successively upon the moving work, and wherein each tool has its own support.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 356.3, for a similar device wherein a plurality of cutting tools share the same common support.
- 404+, for a cutting device which includes a plurality of tool stations and means to move the work from one station to another.
- 356.2** This subclass is indented under subclass 355. Device including means to to rectilinearly move the tool toward the work on one stroke and away from the work on the other stroke.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 613+, for rectilinearly reciprocating tool driving means, per se.
- 356.3** This subclass is indented under subclass 355. Device including more than one individual tool on a tool support.
- (1) Note. The individual tools on the tool support may act simultaneously or successively or some simultaneously and some successively, depending, for example, on their relative positions on the tool support and the manner in which the tool support moves them to the cutting zone.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 356.1, for a similar device having a plurality of cutting tools, each tool being mounted upon a separate support.

- 357** This subclass is indented under subclass 350. Device which incorporates a plurality of actuated tools operable in succession upon the moving work at locations spaced longitudinally of the path of work-feed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 39+, for methods involving a plurality of cutting steps in general.
 255+, for work fed intermittently to a succession of tools.
 301+, for a flying cutter combined with other type cutter.
 404+, for means to move work from one tool station to another.

- 358** This subclass is indented under the class definition. Device provided with a detector* for the product, a transmitter* and means to effect the functioning of at least a part of the device as direct or indirect result of the receipt by said means of a detected and transmitted signal or impulse.

- (1) Note. In this and the indented subclass, that part of the device whose functioning is effected in response to the signal or impulse will be referred to as a "controlled apparatus".
- (2) Note. For patents in which the functioning of a controlled apparatus is affected (e.g., varying the speed of the work or cutter, or changing the working conditions of the device) in response to deviations of an operating condition of the device or a component thereof, as distinguished from response to product, see subclasses 72+.
- (3) Note. For patents in which the controlled apparatus is a means to handle the cut product, see subclass 79.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 61, for stopping of device responsive to product sensing.
 71, for control means responsive to indicia bearing tape or card.
 72+, and see (2) Note above.
 79+, and see (3) Note above.

- 360+, for similar structure responsive to work.

SEE OR SEARCH CLASS:

- 177, Weighing Scales, subclasses 60+ for the combination of a cutting machine and a weighing scale which receives material cut, or to be cut, by the cutting machine, characterized by means to actuate, or to modify the operation of, the cutting machine in response to determination of the weight of material accumulated on the weighing scale.

- 359** This subclass is indented under subclass 358. Device in which the controlled apparatus includes a tool* and/or a tool driving train and the function effected is the regulation of movement of said tool.

- (1) Note. Included in this subclass are devices in which the cutter moves through a cutting cycle, and devices in which the cutter is shifted or positioned relative to the work or product.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 368, for a cutter shifted relative to the work in response to work, and see (1) Note under subclass 368 for meaning of the word "shifted".
 369, and 370+, for a cutter actuated to cut responsive to the work.

SEE OR SEARCH CLASS:

- 234, Selective Cutting (e.g., Punching), subclass 64, for a punched card reproducer operable as a gang punch (each newly punched card serves as a pattern to control selection of tools to punch the following card).

- 360** This subclass is indented under the class definition. Device provided with a detector* for the work, a transmitter*, and means to effect the functioning of at least a part of the device as a direct or indirect result of the receipt by said means of a detected and transmitted signal or impulse.

- (1) Note. In this and the indented subclasses, that part of the device whose

functioning is effected in response to the signal or impulse will be referred to as a “controlled apparatus”.

- (2) Note. For patents in which the functioning of a controlled apparatus is affected (e.g., varying the speed of the work or cutter, or changing the working conditions of the device) in response to deviations of an operating condition of the device or a component thereof, as distinguished from response to work, see subclasses 72+.
- (3) Note. For patents in which the controlled apparatus is a means to handle the product, see subclass 80.
- (4) Note. For patents in which the controlled apparatus is a means to stop work movement and a means to initiate a cutting cycle, see subclasses 208, 209+, and 211+.
- (5) Note. For patents in which the controlled apparatus is a “flying” cutter, see subclasses 286+ and 307.
- (6) Note. The combination of means to produce a mark on work and means to detect the mark, in response to which detection, an operation is effected, will be found in the appropriate mark-producing class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 62, and 63+, for stopping means responsive to work.
- 71, for control means responsive to indicia-bearing tape or card.
- 72+, and see (2) Note above.
- 80, and see (3) Note above.
- 208, 209+, and 211+, and see (4) Note above.
- 286+, and 307, and see (5) Note above.
- 358+, for similar structure responsive to product.

SEE OR SEARCH CLASS:

- 173, Tool Driving or Impacting, subclasses 2+ for automatic control of a power operated tool driving or impacting means.

- 234, Selective Cutting (e.g., Punching), subclasses 25+, for work-responsive means which controls an auxiliary operation in a selective cutting machine; subclasses 63+ for control of tool selection by such means.

361 This subclass is indented under subclass 360. Device in which the detector* is provided with means to govern or regulate or adjust the action or position of said detector*, or the transmitter*, or the impulse receiving element.

362 This subclass is indented under subclass 361. Device in which the control or regulating means regulates the duration of time existing between the effectuation of the signal or impulse and the effectuation of the functioning of the apparatus.

363 This subclass is indented under subclass 361. Device in which the control means is effective to alter the extent of the cut product.

- (1) Note. The “extent” of a cut product is defined as that dimension parallel to the direction of work movement regardless of the size or extent of that dimension relative to other dimensions, (i.e., for the purpose of this subclass the length or extent of a product may be smaller than the width thereof if short pieces are cut from relatively wide work).

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 241+, for other means to vary the product length in a subclass 202 type of cutting device.
- 287+, for other product-length changing apparatus using a “flying” cutter.
- 354, for means to vary the timing of the tool relative to moving work, responsive to a work characteristic.

364 This subclass is indented under subclass 360. Device provided with more than one detector*.

- (1) Note. Included in this subclass are patents to device provided with plural work-sensors usable one at a time alternately or selectively; or provided with plural work-sensors usable together, in either cooperation or opposition, to con-

trol the same function or to control different functions in predetermined sequence.

365 This subclass is indented under subclass 360. Device in which the detector* includes a light-sensitive means responsive to light impinging on said means to energize an electrical circuit and the detection of work is effected by a change in the quantity or quality of the light received by said means either directly (as by work's moving between said means and the source of said light), or indirectly (as by reflection from the work).

- (1) Note. Examples of the means referred to above are vacuum tubes and light-sensitive detectors.
- (2) Note. Included herein are patents in which a beam of light is reflected from the work or an index mark thereon to the light-sensitive-means, as well as patents in which the work covers and uncovers the light-sensitive means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 72+, for a photo-electric work-sensor in a "self-regulating" device.
- 289, for a photo-electric work-sensor in a "flying" cutter device.

SEE OR SEARCH CLASS:

- 250, Radiant Energy, subclasses 200+ for photocell detector and circuit.

366 This subclass is indented under subclass 360. Device in which the controlled apparatus is a mechanism to prevent movement of a part or element of the device or to prevent movement of the work, said mechanism being provided with means to disable the movement-preventing mechanism and in which the function effected is activation of said disabling means by the work-responsive means, whereby a subsequent operation is permitted.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 399+, for interlock means controlled by other parts or elements of the device, and see the "Search This Class, Sub-

class" notes under subclasses 399+ for other interlock subclasses.

367 This subclass is indented under subclass 360. Device in which the controlled apparatus includes means to move, guide, decelerate or stop the work, and the function effected is the actuation or modification of the operation of said means.

- (1) Note. Included herein are patents provided with means to effect final registry of work with respect to its cutting position after initial work movement but prior to cutting.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 209+, for means to control work movement in combination with means to initiate cutting cycle, both in response to a work-sensing mechanism.

SEE OR SEARCH CLASS:

- 226, Advancing Material of Indeterminate Length, subclasses 10+ for means to sense material and means to control the operation of material advancing means.

368 This subclass is indented under subclass 360. Device in which the controlled apparatus is a cutter movable in a direction other than in the work-cutting path and the function effected is the movement of said cutter in said other direction.

- (1) Note. The inclusion of the term "other" in the above definition is not intended to exclude patents having claimed means to impart a work-cutting movement. Patents claiming such means (per se, classifiable in other subclasses in this schedule) and, in addition to such means, claiming means to impart a supplemental movement (such as for locating the cutter in, or shifting it to, a different position relative to the work or the machine; e.g., to cut a different part of the work, or place the cutter out of operative position) responsive to the work-sensing means, will be placed in this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

359, for similar structure responsive to product.

369 This subclass is indented under subclass 360. Device including a detector* which is moved by, and to an extent proportional to, movement of the work; further including means to effect a signal or impulse only when the extent of such detector* movement reaches a predetermined amount; and in which the controlled apparatus is a cutter, the controlled function effected being the initiation of movement of said cutter through a cutter cycle.

- (1) Note. Included in this subclass are patents provided with means for changing the extent of work movement or detector movement required to initiate the cutting cycle.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

208, for similar structure in which the work movement is claimed as stopped prior to cutting.

370 This subclass is indented under subclass 360. Device in which the controlled apparatus is a cutter and/or a cutter driving train and function effected is the initiation of movement of said cutter through a cutting cycle.

- (1) Note. Included in this subclass are patents in which the work itself is uniformly electrically conductive, and the work completes an electrical circuit in the detector*.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

210, 211+, 266+, and 369+, for other work-sensing means to initiate the cutting cycle of a cutter.

359, for similar structure responsive to product.

371 This subclass is indented under subclass 370. Device in which the detector* is operative to sense the presence of an index, or a protuberant or re-entrant portion, in or on the work, to initiate the cutting cycle.

- (1) Note. Included in the terms “index”, “protuberant portion” and “re-entrant portion” are such indicia as a hole or notch in the work, a mark (e.g., printed) on the work surface, an electrically conductive area on the work which completes an electrical circuit in the detector and transmitter system, and bumps or projections on the work. Also included within the scope of such terminology are articles, or spaces between articles, in work which comprises spaced articles connected together by a connecting medium (e.g., tape, string, etc.), the connecting medium of which work is to be severed between adjacent articles.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

365, for devices in which a mark on the work is interposed in a light responsive (e.g., photocell) circuit.

372 This subclass is indented under subclass 370. Device in which the transmitter* includes an electrical circuit and the detector* includes a make-break portion in said circuit for completing or interrupting the circuit to initiate the cutting cycle.

- (1) Note. Contact of the work with the trip switch may be direct, or indirect as by engagement of the work with a lever or linkage connected to the trip switch.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

290+, for other trip switch sensing means in a “flying” cutter.

SEE OR SEARCH CLASS:

200, Electricity: Circuit Makers and Breakers, subclasses 61.13+, 61.19+, 61.41, and 61.42+, for other detector switches.

373 This subclass is indented under the class definition. Device wherein means to change the location or position of passive means to orient the moving work cooperates significantly with means to move a tool through a tool stroke* or a part of such stroke.

- (1) Note. The work guide functions merely in a passive manner to orient or influence the direction of motion of work which is moved by another means.
- (2) Note. The generally lateral displacement of work which may be incidentally caused by movement of work guide means is not considered work-feeding (work moving) within the definition of this term. A work guide is thus distinguishable from work-feed means or supplemental work-feed means.
- (3) Note. The subject matter of this subclass includes a work guide which is carried by or moved by the tool merely as a matter of convenience or compactness in design even though its movement has no effect on the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 162+, for means to guide a cut product.
- 241+, 270, 272, 276+, 279, and for many disclosures of a work guide in a machine of subclass 202 type.
- 306+, 310, for interrelated work guide and flying cutter.
- 410+, 412+, 418+, for work guide or work-mover guide related to the movement of work toward a tool.
- 438+, for means to guide moving work, generally.

374 This subclass is indented under the class definition. Device in which means to move or render active means to maintain or retain work stationary, or means to move or render active means presenting an obstacle or bar to work movement, cooperates significantly with means to move a tool through a tool stroke* or a part of such stroke.

- (1) Note. This subclass includes a device in which the immobilizer is merely mounted on the tool or tool support, even though the motion of the immobilizer may have no useful effect on the work; e.g., the immobilizer is movably mounted merely as a convenience or to simplify the machine design.

- (2) Note. This subclass includes work immobilizers which restrain and hold work stationary by means of suction, magnetic attraction, impaling pins, or locating pins, as well as immobilizers which clamp work or provide stopping abutment therefor.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 181+, for interrelated tool actuating means and means for immobilizing hollow work.
- 202+, for interrelated tool actuating and work moving means, with incidental showings of work immobilizers in many subclasses which relate to the stopping or holding of work.
- 367, for work movement controlled by means responsive to work in a cutting machine.
- 373, for interrelated tool actuating and work guide moving means.
- 451+, for work immobilizer generally associated with a cutting machine.
- 454+, for a work clamp interrelated to or combined with a tool guide.

375 This subclass is indented under subclass 374. Device in which the means cooperating with the tool moving means comprises a plurality of opposed solid jaws or surface elements which are made effective by movement of one or more of said jaws or surface elements to grip the work frictionally and hold it in desired position fixedly with respect to a tool station.

- (1) Note. Clamps which act to move the work, as well as hold it in fixed position after movement ceases, are not found in this subclass, but will be found in the appropriate subclass relating to work moving (including those directed to the work-moving, tool-moving relationship).
- (2) Note. In this subclass are found disclosures of a clamp driven in timed relationship to a tool as from a common drive shaft or power train or from a separate power source and related to the tool stroke only by timing control mechanism.

- (3) Note. For device actuated in timed relationship to a tool, and disclosed as being of utility as a “stripper” as well as a clamp or holddown, see appropriate subclasses indented under subclass 111.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 282+, for work clamping means effective during the dwell of intermittently effective work moving means which coincides with a tool stroke.
- 452+, for a cutting device including a separate, manually or randomly controlled or actuated clamp.
- 453+, for combined clamp and tool guide, wherein some clamps are actuated by or incidental to movement of tool.

376 This subclass is indented under subclass 375. Device in which the clamp is slidably mounted on the tool or tool support by means including a guide which, after the clamp has been halted by engagement with the work, causes a change of direction of the tool movement from that in which both it and the clamp have been moved by the tool driving force.

- (1) Note. Examples are found in draw-cutting machines, wherein inclined guide means between tool and clamp serve to force the tool away from its initial vertical downward motion after the clamp has settled firmly upon the work, thereby effecting a slicing or “draw cut”.

377 This subclass is indented under subclass 376. Device including means which require that the clamp be urged against the work with a predetermined force before the guide becomes effective to deflect the tool.

378 This subclass is indented under subclass 375. Device including means to deliver incremental clamping force in proportion to incremental resistance exerted by the work against the tool, so that the clamping force (additional to a predetermined force; e.g., the weight of the clamp) is proportional to the resistance which the tool meets in its working stroke.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 376+, for many disclosures wherein the clamp takes some of the reaction of the tool force, in order to deflect the tool into an oblique, draw-cutting direction.

379 This subclass is indented under subclass 375. Device wherein there are distinct phases of clamp drive, through different drive means acting in succession or in varying combinations.

- (1) Note. The subject matter of this subclass extends beyond a mere variable force drive for a clamp.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 376+, for the special case of a clamp driven through the ultimate portion of its stroke by reaction of the tool as it is deflected from its initial direction of motion by guide means on the partially tightened clamp.
- 385+, and 388+, for disclosure of a variable force clamp drive.

380 This subclass is indented under subclass 375. Device wherein proper timing of the tool stroke with respect to the clamp actuation is assured by provision of means responsive to a predetermined travel of a clamp jaw or to predetermined developed clamping force, which means generates a signal or impulse which causes or permits initiation of a tool stroke.

- (1) Note. The sequencing means, as defined in this subclass, is a specific application of an “interlock” (for which in general see subclasses 399+).
- (2) Note. Mere timed actuation of clamp and tool in sequence, as by properly phased cranks or cams, does not meet the definition of “sequencing means”.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 221, for interlock between work-feed and tool actuation in machines of the subclass 202 type.

- 399+, for sequencing features in general, and see (1) Note above.
- 381** This subclass is indented under subclass 375. Device, including means to permit voluntary manipulation or actuation of the clamp, either in addition to or in place of the clamp movement derived from or timed with the tool driving means.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 57, for a cutting device having means for manually overriding a cyclic operation of a part (or parts) and means to bring the device back to normal cyclic operation when the manual impulse is removed.
- 452+, for manually or randomly controlled or actuated clamp associated with a cutting machine.
- 382** This subclass is indented under subclass 375. Device in which a tool is rigidly mounted on or made integral with a displaceable surface element of the work-gripping means.
- (1) Note. Both tools of the cutting pair are movable. One tool engages the work to clamp it against a work support before the other tool engages the work in its cutting stroke.
- (2) Note. This subclass includes such devices as split die blocks which move together to clamp the work before the cutting tool engages it.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 266, for a tool carried by work-feed means.
- 319, for means to secure work to rectilinearly movable tool carrier, in a machine of the flying cutter type.
- 567, for a tool with work clamped thereto and movable against another tool.
- 383** This subclass is indented under subclass 375. Device, in which the actuated tool or its support, in some portion of its movement approaches and drivingly engages a movable clamp jaw or element rigid therewith, thus driving the clamp jaw in one direction only.
- (1) Note. The clamp is not mounted on the tool.
- (2) Note. The clamp is usually moved, by engagement with the tool, against the force of gravity or that of a pre-loaded spring.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 456, for tool or tool support rigid with movable clamp jaw, where tool stroke is not timed with or related to the clamp stroke.
- 384** This subclass is indented under subclass 383. Device wherein the clamp jaw is moved away from its applied or work-engaging position by direct engagement with cutter or element secured thereto.
- (1) Note. The clamp jaw is moved against the work by other means, such as gravity or preloaded spring, when the tool withdraws from contact with the jaw.
- 385** This subclass is indented under subclass 375. Device, in which a tool or an element rigid therewith, during the tool stroke serves to impart motion to a cam, lever, linkage, or other force-transmitting means which drives the clamp.
- (1) Note. The force-transmitting means in the definition of this subclass comprehends any mechanical or fluid pressure mechanism operatively interposed between tool or tool support and movable clamp jaw, including for example a simple pivoted link connection, but excluding a direct driving abutment, for which see subclasses 383+.
- (2) Note. A clamp which is moved away from closed (actuated) position by linkage driven by tool or tool support, and which is biased or driven toward closed position by other means will not be found here, but in subclass 375 (or subclasses 388+ for yieldable drive). Also see (2) Note, under subclass 388.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

375, and 388+, and see (2) Note above.
383+, for a clamp jaw driven in one of its two directions by direct impact of tool or tool support, and see (1) Note above.

386 This subclass is indented under subclass 385. Device in which the force transmitting means between tool and clamp comprises a resilient, deformable or slippable element.

- (1) Note. See (1) Note under subclass 387.
- (2) Note. The yieldable element may be included in the drive as a mere safety feature to prevent excessive overload strains, or it may yield during normal conditions of machine operation, within the purview of the definition of this subclass.
- (3) Note. A frangible element, such as a shear pin, constitutes a yieldable drive element for the purposes of this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

388+, for other examples of a clamp driven, in synchronism with a tool, through a resilient or slipping drive train.

387 This subclass is indented under subclass 386. Device in which the force-transmitting means comprises an elastic element (solid or fluid) which exhibits the characteristics of a spring throughout the expected range of forces applied thereto during normal operation of the machine.

- (1) Note. The definition of this subclass is restricted to drive means which function in a springlike manner during normal or expected conditions of operation of the machine. Such means as a preloaded spring, interposed in a clamp drive train for the purpose of yielding only to relieve excessive strains during overload conditions, would not be classified here but in subclasses 386 or 388 as a yieldable drive element.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

386, and 388, and see (1) Note above.
389, for other examples of a clamp driven in timed relation to a tool through a resilient drive train.

388 This subclass is indented under subclass 375. Device wherein the clamp-actuating means comprises a force-responsive (i.e., resilient or slipping) element forming part of the force-transmitting train which moves the clamp toward its applied condition, such element serving to limit the force which can be exerted on and by the movable clamp jaw.

- (1) Note. The yieldable element may be a mere overload responsive means, not effective during normal conditions of operation. See (2) Note and (3) Note under subclass 386, supra.
- (2) Note. A clamp which is continually biased toward closed position, but is raised cyclically by power-driven linkage will be found in this subclass, even though the linkage is moved by a tool or tool support. But see subclasses 383 and 385+ for a clamp biased toward open position and driven toward actuated position, directly or through linkage, by the tool support.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

383, and 385+, and see (2) Note above.
386+, for a clamp yieldably driven from a tool or tool support.

389 This subclass is indented under subclass 388. Device wherein the force-responsive element (solid or fluid) has the characteristics of a spring or its equivalent throughout the expected range of forces applied thereto during normal operation of the machine.

- (1) Note. The presence of a relief valve in a fluid-pressure drive means indicates that the drive exhibits the characteristic of yield ability under certain conditions, hence is not wholly "resilient" (see (1) Note under subclass 390 and (1) Note under subclass 387).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

390, for fluid-pressure yieldable drive means for a clamp.

390 This subclass is indented under subclass 388. Device, in which the clamp is moved by piston and cylinder or equivalent device subjected to hydraulic or pneumatic force, and provided with relief valve or other output limiting means.

(1) Note. The disclosure of a relief valve or other out-put limiting device in the fluid pressure drive system is evidence that the drive is "yieldable" rather than "positive" or "resilient".

391 This subclass is indented under subclass 374. Device, in which the means cooperating with the tool moving means is an obstacle or bar to work movement across the path of the work which functions by resisting or reacting to the work's abutting it.

(1) Note. Most of these stops are adjustable, and most of them are actuated to release or prevent interference with cutting operation and/or delivery of the product.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

392, for actuated work stops located at front and rear of work to "stabilize" it.
467+, for a separate, manually controlled or actuated workstop abutment.

392 This subclass is indented under subclass 391. Device wherein a plurality of stop means are effective to block the work against movement in two diametrically opposite directions.

(1) Note. These devices do not serve as clamps, nor do they have any positioning function if the work is not correctly placed.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

207, and 228, for a work aligner including stops which are capable of correcting small misplacements of the work.

393 This subclass is indented under subclass 391. Device including mechanical means for positioning the stop to different positions or to cause another differently positioned stop to be actuated or made effective between tool strokes.

(1) Note. The general purpose of the combination of this subclass is to effect different positions of work with respect to the tool in different cutting cycles.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

238+, for unequal work-feed increments in recurring series, in a cutting machine of subclass 202 type.

241+, for means in general to change length of work-feed increment.

254, for plurality of work stops successively effective in association with supplemental work-feed means.

268+, for abutment to locate work at tool station, in a machine of subclass 202 type.

394 This subclass is indented under subclass 391. Device in which the stop moves in unison with the tool or tool support throughout at least a portion of the tool stroke.

(1) Note. In order to move in unison with the tool or tool support, the stop must move in the same path as the tool (or parallel thereto) and at the same speed and simultaneously with the tool movement.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

383+, for work clamp moved by direct impact of tool or tool support.

395 This subclass is indented under subclass 394. Device wherein the stop structure is fixed rigidly to the actuated tool.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

382, for clamp jaw fixed to or integral with tool or tool support.

396 This subclass is indented under the class definition. Device wherein means to move a tool through all or part of a tool stroke* cooperated significantly with means to make effective a member which serves to limit the extent of motion of a work pusher or work carriage.

- (1) Note. This device is frequently employed to determine the successive positions of a manually moved work pusher or "back gage".
- (2) Note. There may be a plurality of such members to effect stoppage of work in different locations.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 239, for unequally spaced stops on work carriage in machine of subclass 202 type.
- 391+, for interrelated tool moving means and means to actuate work-stop abutment.
- 416, for means in general to stop a work conveyor.

397 This subclass is indented under the class definition. Apparatus wherein means are provided to change the location or position of a protective obstruction for the operator tool blade or work, which cooperates significantly with means to move a tool through a tool stroke* or a part of such stroke.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 544+, for guard means which does not move in cooperation with the cutter.

SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, subclasses 613+ for a similar device for moving a guard into protective position by some part of the machine.
- 474, Endless Belt Power Transmission Systems or Components, subclasses 144+ for a guard or housing for a belt and pulley drive system.

397.1 This subclass is indented under subclass 397. Device wherein the protective obstruction protects the work.

398 This subclass is indented under subclass 397. Device comprising means which is caused to cover the open guide slot below the moving tool and adjacent the work supporting table.

399 This subclass is indented under the class definition. Device characterized by mechanism for detecting the presence or absence or passage of a portion of the device, or for detecting the characteristics of a pattern or templet, which mechanism effects a signal or impulse as a result of such detection and includes a component (disclosed or claimed) for transmitting such signal or impulse; further characterized by means to permit or effect the functioning of at least a portion of said device in response, directly or indirectly, to the receipt by said means of said signal or impulse; and further distinguished in that the portion sensed is other than said part or other than a part or sub-assembly in, or driven by, a direct drive train moving said part.

- (1) Note. In this and the indented subclasses, that part of the device whose functioning is effected is termed the "member" or "assembly" or "interlock" whose operation is controlled; the portion sensed is termed an "object" or "element"; and the meaning of the term "remote" (used in the title) will be elaborated on in (3) Note below.
- (2) Note. This and indented subclasses are the residual subclasses for the placement of patents claiming means for controlling the operation of a moving or movable member or assembly or interlock in response to the sensing of an object other than the controlled, moving member or assembly or interlock itself. Subclasses 358+, 360+, and 71 to which these subclasses (399+) are analogous, provide for patents in which the sensed object is the product, the work, or indicia-bearing control means, respectively.
- (3) Note. Where the sensed object is an element integral with, or driven by, a direct drive train, which train moves the controlled assembly, with the result that movement of the assembly is always accompanied by movement of the sensed

element, then the element is part of the controlled assembly itself, and thus the element is not “remote” therefrom as required by the title of subclasses 399+. Patents disclosing and claiming such features will not be placed in these subclasses, (399+), but will be found in other subclasses of the schedule, often under the heading “unicyclic”, or other equivalent term.

- (4) Note. This and indented subclasses do not include patents disclosing structure provided merely with a continuous train of mechanism inherently operative to perform a plurality of operations, according to a regular or uniform cycle. For such patents, see other subclasses appropriate to the desired operations to be performed.
- (5) Note. As a repository of patents this subclass (399) includes patents disclosing and claiming structure in which the member or assembly includes mechanism (i.e., an interlock) to prevent movement of the member or assembly, said mechanism or interlock being provided with means to disable the movement preventing mechanism, and in which the sensed object effects the activation of the disabling means, whereby the mechanism or interlock is released and subsequent movement of the member or assembly is permitted. For interlock release means controlled by the presence of the product, see subclasses 358+. For interlock release means controlled by the presence of work, see subclass 366.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 59, and 60, for random stopping of part of the device followed by a subsequent operation.
- 61, 79+, and 358+, for sensing of product to effect: (a) random stopping (61), (b) handling of the product (79+), and (c) the operation of a part of the device (358+) (e.g., the tool), respectively.
- 62, 81+, 221, 222, 225+, and 380, for sensing of tool-feed to effect: (a) random stopping (62), (b) handling of

product (81+), (c) release of work-feed interlock (221), (d) initiation of work-feed (222), (e) control of work movement in a device wherein the tool cuts during work stoppage (225+), and (f) sequencing of tool and work clamp (380), respectively.

- 62, 221, 231+, and 352, for sensing of work-feed means to effect: (a) random stopping (62), (b) release of tool-feed interlock (221), (c) control of tool-feed in a device wherein the tool cuts during work stoppage (231+), and (d) tool actuation in a device wherein the tool is timed with respect to moving work (352), respectively.
- 63+, 80, 209+, 211+, 286+, 307, and 360+, for sensing of work to effect: (a) random stopping (63+), (b) handling of the product (80), (c) control of work movement in a device wherein the tool cuts during work stoppage (209+) (d) initiation of tool feed in a device wherein the tool cuts during work stoppage (211+) (e) movement of “flying” cutter (286+), (f) shifting of work adjacent “flying” cutter (307), and (g) the operation of a part of the device (360+), respectively.
- 71, for a tape or card bearing indicia and means responsive to such indicia to control operation of the device.
- 131, for interlock between product stripper and tool-return means.
- 203+, 484, and 591, for unicyclic operation of (a) a device wherein the tool cuts during work stoppage (203+), (b) a carrier for a rotatable disc tool (484), and (c) a carrier for a cyclically operating tool (591), respectively.
- 380, for sensing of work-clamping operation to effect tool-feed.

SEE OR SEARCH CLASS:

- 72, Metal Deforming, subclasses 6+ for an analogous condition-responsive means controlling a metal-deforming means.
- 192, Clutches and Power-Stop Control, subclass 116.5 for stop mechanism, particularly subclasses 129+, for safety device or interlock.

400 This subclass is indented under subclass 399. Device including mechanism to start the movement of that portion of the assembly whose operation is controlled by the sensed object.

- (1) Note. The difference between patents in this subclass (400) and patents in subclass 399 is that subclass 399 provides for structure wherein movement of the controlled member or assembly is permitted (e.g., by effecting release of an interlock), whereas this subclass (400) provides for structure wherein movement of the controlled member or assembly itself is started or accomplished as the direct result of the detection of the sensed object (i.e., element, pattern or other portion remote from the controlled member or assembly itself).

401 This subclass is indented under the class definition. Apparatus including (a) dynamic means to effect movement of the work with respect to the zone of the claimed cutter, or (b) a device associated and moving with the work to hold or support the work and facilitate movement thereof with respect to such zone.

- (0.5) Note. An extension of a plane from the outer surface of a cutting edge of a cutter closest to the work will be referred to as a “plane of cut” or “cutting plane”.
- (1) Note. This and indented subclasses are the residual subclasses for the placement of a patent in which a work-conveying means is claimed or clearly inferred from the context of the claim and in which a cutter is claimed. A patents in which work movement is effected by an operator grasping the work itself and pushing or pulling such work without correspondingly moving the work-associated device is excluded from this and the indented subclasses (401+).
- (2) Note. The work-moving means may comprise any structure by which the work is moved relative to a cutting zone even though the structure itself may be advanced manually. Examples of such structure are a moving table, a pusher, a belt, an air-blast nozzle, etc.

- (3) Note. For the relationship of this group of subclasses to other work-handling classes, see the Class Definition of this class (83), section II, Lines With Other Classes, subsection B, Relationship to Material Handling Classes.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 202+, for a cutting apparatus in which work is moved, stopped, and cut during the dwell in work movement.
- 284+, for a device which cuts moving work by a transverse cutter moving with the work during cutting.
- 350+, for a cutting apparatus including a tool which approaches the work and recedes therefrom in a cutting stroke which is otherwise timed or synchronized with respect to work movement.
- 469+, and 651+, as appropriate, for a patent in which a cutter is claimed and no work-moving means is claimed, even though it is apparent that the work must move to be cut.
- 471+, for a cutting apparatus including a relatively immovable work-supporting table, and a rotatable disc blade cutter.
- 648+, for a cutting apparatus in which work movement is effected by an operator grasping the work itself and pushing or pulling such work relative to a work support.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, for a power driven conveyor in which no tool is claimed significantly, and see (3) Note above. Search subclasses 343.1+ and 375+ for a conveyor having means for orienting the conveyed load relative to the conveyor.
- 226, Advancing Material of Indeterminate Length, for means to move work, generally, without recognition of both the leading and trailing ends thereof.
- 269, Work Holders, appropriate subclasses and Section II, Lines With Other Classes, paragraph B, of that class for the line between this class and Class 269.

- 271, Sheet Feeding or Delivering, for means to move a relatively thin, flat workpiece of finite dimensions.
- 414, Material or Article Handling, for means to move an individually recognized workpiece, generally.
- 402** This subclass is indented under subclass 401. Device provided with means to force a gas or a liquid against the work itself, whereby the work is propelled by such gas or liquid in a desired direction of work movement.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 22, for method of cutting including fluid application and an ancillary treatment.
- 24, for method of cutting including fluid application for product handling.
- 53, for method of cutting including fluid application for cutting.
- 98+, for product handling by fluid current.
- 169, for means to apply transient, nonpropellant fluid to work.
- SEE OR SEARCH CLASS:
- 19, Textiles: Fiber Preparation, subclass 205 for a fiber preparing device including pneumatic means to carry fibers from one location to another.
- 226, Advancing Material of Indeterminate Length, may include a nominal recitation of a supply or take-up coil (e.g., less than a support for such a coil or a cooperative relationship between a tension or exhaust detector* and reel driving or reel stopping means, etc.), subclasses 97.1+ for fluid current means to advance the material.
- 403** This subclass is indented under subclass 401. Device in which the work conveyor comprises a rotatable disc having a work passageway starting at the center of one of its faces and terminating in its periphery and in which the cutter has a cutting plane substantially perpendicular to the disc radius which defines the axis of the passageway at the moment of cutting.
- (1) Note. The patents included herein are commonly known as Beria-type fiber cutters after the name of the inventor of the device of U.S. Patent No. 1,723,998.
- In this and other patents of this type, filamentary material is led axially into the center of the disc wherein the material makes a right angled turn into a work passage, usually radial, and flows through the passage. The rotation of the disc effects revolution of the radially extending portion of the filament in the plane of the rotating disc, and the centrifugal force imparted by the rotation simultaneously effects movement of the filament outwardly of the axis.
- 403.1** This subclass is indented under subclass 401. Device including means to vary or adjust the rate at which the work moving means advances the work toward the cutter.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 263+, for means to vary the rate of speed of the moving work during a dwell of the work-feed means.
- 298, for means to interrelate the tool and the work-feed means.
- 312+, for means to regulate the work speed relative to a flying-cutter means.
- 429, for means to effect a different rate of speed between the work and the tool.
- 404** This subclass is indented under subclass 401. Device provided with a plurality of separated cutting zones, at each of which zones is located a cutter cutting in a plane acting on a distinct portion of the same material, and including means to effect movement of said material from a preceding cutting zone to a succeeding cutting zone in sequence.
- (0.5) Note. In this subclass, a plurality of punches or dies which act simultaneously in a single stroke or cycle of the tool actuator will be considered as a single cutting zone or tool station: hence, means to feed to such zone will be found elsewhere in this group of subclasses (401+). If two punches or sets of punches are positioned at the same general location, but do not act simultaneously, then the two punches will be considered to define plural cutting zones and the device will be found here (404).

- (1) Note. The word “material” as used above is inclusive of that work which is to be cut at a first cutting zone, and of that product of the first cutting zone which is work to be cut at a second cutting zone.
- (2) Note. For further amplification of specific forms of “cutting zone”, see (1) Note of subclass 405, (1) Note of subclass 406, and (2) Note of subclass 407.
- (3) Note. This and indented subclasses differ from subclasses 78+ in that these subclasses (404+) provide for machines distinguished by a second cutter which acts upon the product of a first cutter and, further, by structure for moving the material (i.e., the product of the first cutter) between the sequentially acting cutters; whereas subclasses 78+ provides for machines having means for removal of the final product.
- (4) Note. Included in this and indented subclasses are patents disclosing means for changing the direction of the material movement, or the path of the material, between the sequentially acting cutters or cutting zones.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 41, for a method of severing including perforating and cutting to join the holes so perforated.
- 78+, for delivery means for the product of a cutter and see (1) Note above.
- 213+, and 255+, for plural tool stations of the type provided for in subclass 202.
- 300, and 301+, for a “flying” cutter and another type cutter operating sequentially.
- 357, for plural tool stations, in a device wherein a tool is synchronized with moving work.
- 513+, for plural, individually actuated tools.

SEE OR SEARCH CLASS:

- 225, Severing by Tearing or Breaking, subclass 97 for plural breaking tools.

404.1 This subclass is indented under subclass 404. Device wherein a cutter in a preceding zone is positioned, or is capable of being positioned, in such a manner as to have a cutting plane that is not parallel to the cutting plane of a cutter in succeeding cutting zone, and wherein each said cutters make a cut that is parallel to the direction of work movement at the time it is being cut.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 471.3, for a tool angularly adjustable relative to a work support.
- 486.1, for means to adjust a tool angularly relative to its previous position.

404.2 This subclass is indented under subclass 404.1. Device wherein the work moving means, in transporting the work from the preceding cutting zone to the succeeding one, shifts the work so that a different lateral edge will be cut at the succeeding zone than that which was cut at the preceding zone.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 915.3, for an art collection including an ice cutting machine which may include means to manipulate the work between respective tool stations.

404.3 This subclass is indented under subclass 404.1. Device wherein the cutting tool at one of the stations remains passive during its cutting operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 431, for a stationary cutting tool, and means to press the work to that tool during the cutting operation.
- 856+, for a stationary cutter, per se.

404.4 This subclass is indented under subclass 404. Device wherein the cutting zones are arranged in a spaced, overlapping relationship such that their axis and their cutting planes are parallel, and not coincident to one another.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

425.2+, for a device which includes a series of laterally spaced, axially aligned cutting tool stations.

- 405** This subclass is indented under subclass 404. Device in which at least one of the cutters comprises a tool for perforating a hole in the material or a tool for cutting a product from within the boundaries of the material or a tool for cutting a product from within the boundaries of the material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

40+, for method of blanking and cutting.
55, for method of blanking.
660, for pointed perforator, per se.
667, and 682, for punching plus nonpunching tool.
684+, and 698.91+, for punching tool, per se.

- 406** This subclass is indented under subclass 404. Device in which at least one of the cutters comprises a tool having a nonlinear cutting edge acting upon the edge of the material to remove one or more products therefrom and leave portions of the original edge intact, or comprises a tool for severing the material into two products by a nonlinear repetitive pattern cut upon a portion of the material other than its edge.

- (1) Note. See (1) Note of subclass 405 except substitute “notching or pinking tools” for “punches or sets of punches”.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

333, for rotating tool having an undulant cutting edge.
668, and 683, for notching plus nonnotching tool.
671, and 692, for notching tool, per se.
917, for notching “digest”.
918, for pinking “digest”.

- 406.1** This subclass is indented under subclass 404. Device wherein one tool defines two cutting zones separated along the length of the work-feed, which tool cooperates with a work-feed means to cut a slice from the work at each of

the two cutting zones, as the work is moved first in one direction and then in the opposite direction.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

707+, for a rectilinearly reciprocating means which passes the work through one cutting tool station.

- 407** This subclass is indented under subclass 404. Device in which at least one of the tools comprises one or more edged cutters located in the path of moving material and whose cutting plane (as disclosed) is substantially parallel to said path for constant cutting contact with the material thicknesswise thereof.

- (1) Note. See the definition and notes to subclass 425 for further amplification of what is considered to be a slit.

- (2) Note. A plurality of slitters transversely spaced at the same longitudinal location, which slitters simultaneously cut moving material, (i.e., two or more slitters spaced across the material and perpendicular to the direction of material movement), will be considered as a single cutting zone or tool station, whereas slitters obliquely spaced (i.e., one slit to the side and forward of another slit) will be considered as plural cutting zones or tool stations.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

469+, for rotatable disc tool and carrier.
676, for disc-type tool, per se.

- 408** This subclass is indented under subclass 407. Device in which at least another of the cutting zones comprises a cutter of the type which cuts from side edge to side edge of the material across the direction of material movement at said other cutting zone.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

302, for “flying” cutter combined with “slitting” cutter.

409 This subclass is indented under subclass 401. Device in which the work-moving means includes elements or mechanism (mounted on or integral with, and moving with, said means) for securing the work against both forward and rearward shifting of the work relative to the motion of said work-moving means, whereby the work partakes of all the feeding movements of the work mover.

- (1) Note. In this and indented subclasses, the combined work-mover and work-constraining means will be referred to as a “work carrier”.
- (2) Note. A feed drum with radial projections thereon (commonly known as a “pinwheel”) is not considered as a work carrier as defined above if the work enters the pinwheel chordally or tangentially, contacts only part of the periphery of the pinwheel, and leaves the pinwheel chordally or tangentially. For patents directed to such feed means, see subclass 423.

SEE OR SEARCH THIS CLASS, SUBCLASS:

276+, for a cutting device including a reciprocating work-mover, wherein the tool engages the work during dwell of intermittent workfeed.

423, and see (2) Note above.

435.11+, for a cutting device having a rectilinearly moving work carriage and tool adapted to cut parallel to the direction of and during work movement.

437.1+, for a cutting device having a rectilinearly moving work carriage and a tool, generally.

730, for a cutting device including a rectilinearly moving work carriage and including means to cause the cutting device to make plural passes through a diminishing workpiece, including means to effect incremental movement toward the plane of cut.

409.1 This subclass is indented under subclass 409. Device including means to hold two or more pieces individually on the work conveyor for successive movement past a cutting zone.

- (1) Note. The work movement may be along a straight, tortuous or a circuitous path.

409.2 This subclass is indented under subclass 409.1. Device in which the work-moving means is provided with opening through which a portion of the work protrudes for engagement with the cutting means.

410 This subclass is indented under subclass 409. Device provided with a means to restrict the work carrier to travel in a predetermined tortuous or circuitous course.

- (1) Note. See (1) Note of subclass 409 for definition of “work carrier”.
- (2) Note. Included in this subclass are patents provided with a pattern or templet, the pattern serving the dual function of (a) guiding the work carrier, and (b) orienting the work carrier, both with respect to the cutting zone. For other patterns or templets which orient, but do not guide, the work carrier, see subclass 413.

SEE OR SEARCH THIS CLASS, SUBCLASS:

413, and see (2) Note above.

443, for curved or deflecting means to guide the work directly.

410.7 About axis fixed relative to tool station:

This subclass is indented under subclass 410. Device in which the work carrier is restricted to rotate or oscillate around an axis, which axis is stationary with respect to the cutting zone.

SEE OR SEARCH THIS CLASS, SUBCLASS:

267, for rotating work-feeder for a subclass 202 type of cutter.

323, for work-feed for flying cutter, the work-feeder carried by the tool support.

439, for pivotal work guide.

410.8 Infeed:

This subclass is indented under subclass 410.7. Device wherein the work carrier moves with the work through the cutting zone to effect cutting.

410.9 About vertical axis:

This subclass is indented under subclass 410.8. Device that is base mounted and wherein the work carrier is restricted to turn about a line extending toward the center of the earth.

411.1 Cut normal to axis:

This subclass is indented under subclass 410.9. Device wherein the plane of action of the cutting instrumentality is such that that plane passes at a right angle through the line about which the work carrier turns.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

703+, for means to convey a workpiece to and fro through a cutting zone to diminish the size of the workpiece.

411.2 Work guide tube:

This subclass is indented under subclass 411.1. Device wherein the work is directed toward the cutting zone by passing through hollow passage and the work is then advanced through the cutting zone by movement of the hollow passage laterally of the extent of the hollow passage.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

409.1+, for a cutting device including plural means on a single conveyor to constrain plural workpieces.

411.3 Cut normal to axis:

This subclass is indented under subclass 410.8. Device wherein the plane of action of the cutting instrumentality is such that that plane passes at a right angle through the line about which the work carrier turns.

411.4 Oscillating work carrier:

This subclass is indented under subclass 411.3. Device wherein the work carrier moves to and fro less than 360 degrees about the stationary line.

411.5 Multiple cutters:

This subclass is indented under subclass 411.3. Device including more than one instrumentality to effect a cutting action of the class type.

411.6 Coaxial rotary cutters:

This subclass is indented under subclass 411.5. Device including a first cutting instrumentality that cuts by turning more than 360 degrees about its central axis and including a second cutting instrumentality then cuts by turning more than 360 degrees about its central axis, wherein both central axes are coextensive.

411.7 Work stationary during cut:

This subclass is indented under subclass 410.7. Device wherein the workpiece is guided into the cutting zone by a work carrier restricted to move about a fixed line, and wherein the workpiece is immobile during the cutting action.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

202+, for means to intermittently (i.e., cyclically) cause work to advance at a tool station with provision to effect cutting during dwell of work advance; search especially subclass 261 for a device wherein the work is advanced about an axis and wherein advance is effected by an interrupted fictional surface.

412 This subclass is indented under subclass 409. Device provided with means to move the work carrier in a desired place or posture with respect to the cutting zone.

(1) Note. See (1) Note of subclass 409 for definition of "work carrier".

SEE OR SEARCH THIS CLASS, SUB-CLASS:

396, for work-mover stop interrelated with tool-moving means.

413 This subclass is indented under subclass 412. Device in which the orienting means comprises a model, prototype, or design.

(1) Note. Included within the terms "pattern" or "templet", are models which cause the path of movement of the work to be exactly similar or proportional to the outline or form of the model. Cams, eccentrics, and other objects which orient the work carrier to cut a product to a form distorted with respect to the object

are not considered as pattern or templet means. Such objects, if they effect guidance of the work carrier, will be found in subclass 410.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 410, and see (1) Note above.
- 442, for a guide cooperating with a templet or straightedge secured to the work, but not serving to move the work.
- 565, for a tool which is guided by a pattern or templet for tool-positioning movement relative to the work.

414 This subclass is indented under subclass 412. Device in which the orienting means includes at least two stop members, one of which members is fixed to a stationary part of the device and the other of which members is movable, its movement being directly or proportionally related to the work carrier movement, either or both stop members comprising a plurality of successive stopping abutments, whereby the work carrier means is halted successively by the interengagement of one stop member with the successive abutments of the other stop member.

- (1) Note. A notch or depression and a detent cooperating therewith is considered as indexing means for the purposes of this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 239, for similar structure for producing work or work carriage movements in unequal increments between tool strokes.

415 This subclass is indented under subclass 409. Device provided with means supplemental to the work securing means and mounted on the work carrier, which supplemental means contacts and establishes the position of the work with respect to the work carrier.

- (1) Note. See (1) Note of subclass 409 for definition of "work carrier".

- (2) Note. Included herein are patents disclosing means to adjust the supplemental means with respect to the work carrier.

- (3) Note. As disclosed in the patents placed herein, work is located relative to the carrier and thus the work is also located relative to the tool. For other patents claiming work conveying means and wherein, as disclosed, work is located relative to the tool, see subclasses 418+.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 391+, for work-stop abutment interrelated with tool-moving means.
- 418+, and see (3) Note above.
- 467+, for work-stop abutment.

416 This subclass is indented under subclass 401. Device provided with means to interrupt the movement of the work-moving means.

- (1) Note. Included herein are patents disclosing structure in which work-mover stopping means regulates the extent of work movement to the cutter. The extent of work movement may be to that dimension which, when the work is cut through, produces a product of desired dimension, or may be to that distance which, when the work is perforated or notched, produces a product having holes or notches spaced apart by the desired distance.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 396, for interrelated tool moving means and work-mover stopping means.

417 This subclass is indented under subclass 401. Devices provided with means to collect temporarily a reserve supply of discrete workpieces, from which supply said discrete workpieces are to be separated and moved to a cutting zone.

- (1) Note. Included herein are patents disclosing hoppers, work-storage magazines, and gravity feed chutes, serving to hold a reserve of work which is to be cut.

- (2) Note. Included herein are patents disclosing means to insure that only one workpiece at a time is moved from the supply of workpieces.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 281, for means to pick an article from a pack or stack and present such an article to a subclass 202 type of tool.

SEE OR SEARCH CLASS:

- 221, Article Dispensing, appropriate subclasses for hoppers and means to dispense articles therefrom.
271, Sheet Feeding or Delivering, appropriate subclasses, for hoppers and means to feed sheets therefrom.

418 This subclass is indented under subclass 401. Device including means supplemental to the work-moving means, which supplemental means contacts the work and positions said work with respect to the cutting zone.

- (1) Note. The supplemental means may include a passive guide fixed or adjustable with respect to the cutter and a roller inclined to the path of movement of the work-mover, the roller urging the work against the guide. For an adjustable guide, see subclass 421. The supplemental means may include a pair of rollers inclined to the path of movement to the work mover, the rollers being driven or nondriven, but in either case urging the work laterally of the direction of movement of the work.
- (2) Note. Included herein is a patent disclosing two members horizontally movable toward each other to clamp work therebetween, wherein inherently one of the members will engage a workpiece (the first-engaging member thus being a workmover) and move that workpiece toward the other member (the other member thus being the additional means); and in which it is claimed or clearly inferred from the content of a claim (e.g., by recitation of "centering" or similar term) that the work is moved by one such member toward the other

member. See subclass 419 for structure wherein one of the members is fixed relative to the cutting tool. See subclass 452 for work-clamp means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 409+, for a work carrier including means to orient the work carrier relative to the tool or to locate the work relative to the work carrier, but in either case providing means to orient the work relative to the tool.
419, and 452, and see (2) Note above.
421, and see (1) Note above.
443, for curved or deflecting work guide.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, subclasses 343.1+ and 416+ and others for a conveyor combined with means for contacting the conveyed load to orient it relative to the conveyor or a tool station.

419 This subclass is indented under subclass 418. Device in which the supplemental means comprises a member in the path of movement of the work and fixed with respect to the cutting zone to interrupt the work movement at least until the work has been cut.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 163, and 166, for a material-stopping abutment associated with product handling means.
207, 253+, and 268+, for a work-stopping abutment in a subclass 202 type of cutting device.
391+, for work stopping abutment interrelated with a tool moving means.
467+, for work stopping abutment, per se.

420 This subclass is indented under subclass 418. Device in which the supplemental means comprises two members, one member located on one side of the path of work movement and the other member located on the other side of such path, both members contacting the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 448+, for other plural guide elements.

421 This subclass is indented under subclass 418. Device including means to change the position of the supplemental means with respect to the cutting zone.

- (1) Note. Patents placed herein may disclose the function of the adjustment as effecting a variance of the distance between the uncut side edge of the work and the cut side edge of the product. For other patents in which the same function is achieved by shifting the tool means laterally, see subclasses 433, 498+ and 504.

SEE OR SEARCH THIS CLASS, SUBCLASS:

433, 498+ and 504, and see (1) Note above.

422 This subclass is indented under subclass 401. Device including means for urging the work toward the work-moving means.

- (1) Note. Where a patent discloses a pressing member cooperating in a feeding function (as, e.g., an idler roll of a feed couple), the patent (to be placed as an original herein) must claim the pressing member in terms of its pressing function (as by naming it "a presser roll") or claim additional structure effective to urge or permit urging of the presser toward the feeding means.
- (2) Note. Included in this subclass are patents in which the pressure between the presser assembly and the work-moving means is adjustable. Thus patents claiming a feed couple, or equivalent term, (characterized by structure including two rolls between which, and in tangential contact with, the work is moved by the rolls) and also claiming means to adjust the pressure between the rolls, will be included in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

475+, for similar structure in which a member presses work to a movable work-support, which work-support is not claimed as the work-mover.

423 This subclass is indented under subclass 401. Device in which the work-moving means includes projecting and re-entering portions (i.e., lugs or pins), mounted on or integral with said means.

- (1) Note. Included herein are patents disclosing a pusher on a work-moving belt or table, said pusher engaging the trailing end of a work article. Also included herein are patents disclosing a wheel having radial pins or projections engaging in perforations in the work wherein the work enters the pinwheel chordally or tangentially, contacts only a part of the periphery of the pinwheel, and leaves the pinwheel chordally or tangentially, such that the work does not partake of all the feeding movements of the work-mover.

SEE OR SEARCH THIS CLASS, SUBCLASS:

278, for other work-moving means for 202 type of tool.

409, for other work-moving means including work-constraining projections, but in which the work partakes of all the feeding movement of the work-mover.

SEE OR SEARCH CLASS:

226, Advancing Material of Indeterminate Length, subclasses 52+ for pin feeders, per se.

424 This subclass is indented under subclass 401. Device provided with at least two means to move the work, said means being separate in the direction of movement of the work, and in which the cutter is located interjacent said means.

- (1) Note. If the means located beyond the cutter facilitates pulling the work through the cutting zone, it is considered to be a work-moving means for this subclass. For patents in which the means located beyond the cutter facilitates movement of the product away from the cutting zone, see subclasses 102+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 102+, and see (1) Note above.
 110, and 112+, for product-handling conveyor beyond the cutter.
 155, for endless conveyor handling product.

425 This subclass is indented under subclass 401. Device in which a cutter is located at a cutting zone in the path of moving work and whose cutting plane (as disclosed) is substantially parallel to said path and to the direction of movement of the work for constant cutting contact with said work, and including claimed means for moving the work to and through said cutting zone for constant cutting of said work.

- (1) Note. This subclass includes tools known generally in the art as “slitters” as well as saws.
- (2) Note. The word “constant” as used above does not preclude the operation of means to reposition the cutter out of (and thus, also, back into) the cutting zone in the absence of work thereat. The cutting is constant so long as (a) the cutter remains in its cutting position and (b) the work is moved toward and past it. The following conclusions flow from consideration of this qualification:

(i)The cutter does not have a cycle of operation known as “tool feed”), in that it does not move to and through the work during cutting. If the cutter has a movement, its movement is limited to: (1) a bodily movement of the cutter into a position wherein it will cut the work, or out of such cutting position, but in either such case while the work is absent from the cutting zone; or (2) an internal movement such as will present a fresh cutting edge to the work; for example, as by rotation of a rotatable circular blade or by reciprocation of a blade, but in either case while the cutting edge remains in contact with the work. If the cutter is moved into the work while the work is at the cutting zone, such movement is part of a cutting cycle, and a patent claiming such structure is not found herein. For

such patent see subclasses 202+, 284+, and 350+.

(ii)The work may be, for instance, a succession of relatively closely-spaced articles, each of which articles is to be cut or slit longitudinally of the direction of article movement from the leading end to the trailing end of each article regardless of the orientation of the article. It also may be a web of indeterminate length, for instance, which is to be slit longitudinally of its length.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 202+, 284+, and 350+, see (2) Note above.
 469+, for a feature relating to a rotatable disc-blade cutter, alone or cooperating with a mating cutter.
 651+, for a feature relating to fixed blade type of cutter, per se.
 788+, for an endless band-knife cutter positioned for continuous engagement with moving work.

425.1 This subclass is indented under subclass 425. Device including an additional cutter which cuts through the work before or after (in time or space) the cutter having constant contact with the work.

425.2 This subclass is indented under subclass 425. Device provided with at least two distinct tools separated one from the other laterally across the path of moving work.

- (1) Note. The tools of this particular subclass are distinguished from tools of subclasses indented hereunder by the fact that each tool is separately mounted on its own independent shaft or carrier.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 356.3, for a cutting device having a single tool support for plural tools, wherein the support moves with uniformly timed strokes relative to the moving work.

425.3 This subclass is indented under subclass 425.2. Device wherein the tools are laterally spaced on a carrier or shaft which is common to all the tools.

425.4 This subclass is indented under subclass 425.3. Device wherein at least one of the tools is movable or adjustable along the axes of the shaft or the length of the carrier.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

504, for a rotatable disc tool pair wherein one of the discs of the tool pair is axially adjustable.

426 This subclass is indented under subclass 425. Device including means to move the edged cutter, and common mechanism to drive both the cutter-moving means and the work-moving means.

(1) Note. The cutter movement referred to above is limited to a movement as restricted in paragraph A of (2) Note to subclass 425. Exemplary forms of such cutter movement are a reciprocation of the cutter (such as is produced in a "jig-saw" type of cutter) and a rotation of a disc blade type of cutter.

427 This subclass is indented under subclass 426. Device in which the movement of the cutter is to-and-fro (either rectilinear or oscillating) in the direction of work-thickness.

428 This subclass is indented under subclass 426. Device in which the cutter movement is in a direction which is simultaneously transverse to the path of the work, and substantially perpendicular to the cutting plane of said cutter, (i.e., parallel to a surface of the work), and occurs while the work is moving through the cutting zone.

(1) Note. Patents placed herein produce an undulant or zigzag line of separation of cutting. For other patents producing a zigzag line, but without lateral movement of the tool, see subclass 333.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

333, and see (1) Note above.

353, for cutter traveling (e.g., laterally) with respect to moving work.

356, for cutter having periodic lateral feed with respect to moving work.

498+, and 504, for other means to move a tool pair or tool laterally of the direction of movement of the work.

429 This subclass is indented under subclass 426. Device in which the cutter-moving means imparts to the cutter a component of velocity in the direction of movement of the work, and including means to cause the velocity of the cutter to be different in magnitude than the velocity of the work.

(1) Note. Since a reciprocating cutter whose cutting edge is at an oblique angle to the direction of work movement inherently has a varying component of velocity in the direction of work movement as it accelerates and decelerates in its to-and-fro movement, this of itself is not considered a means to bring about a difference between the speed of the tool and the speed of the work. However, if a means is provided to vary the speed of the motion converting mechanism (which effects the reciprocation of such a cutter) with relation to the speed of the work, such patents have been placed in this subclass (429).

(2) Note. A patent claiming means to rotate the cutter in a negative direction; e.g., a direction opposed to the movement of the work, will be found herein.

430 This subclass is indented under subclass 426. Device in which the means to move work turns about an axis of rotation and engages work to move the work tangentially of said means, and in which the cutter is a circular disc-blade turning about the same axis of rotation.

(1) Note. To be placed herein, a patent must include an edged cutter and a work-moving roller or disc coaxial with each other. A tool which is recited in the claim as both a cutting means and a work-moving

means is considered to be a coaxial cutter and work-mover if it otherwise fits the limitations of the definition.

- (2) Note. A roller serving both as work-moving means and as the backup anvil for an edged cutter not revolving about such axis is not itself considered to be an edged cutter. For such structure, see subclass 434. For similar structure wherein the roller does not function as a work-moving means, see subclasses 505+.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 434, and 505+, and see (1) Note above.
500+, for a roller having a cutting edge at the end thereof, the periphery of which roller could function as a work-moving means.

- 431** This subclass is indented under subclass 425. Device including means additional to the work-mover or a cutter located adjacent the edged cutter and acting in a direction which is simultaneously parallel to the plane of said edged cutter and perpendicular to the direction of work movement to urge the work upon the edged cutter.

- 432** This subclass is indented under subclass 425. Device in which, as disclosed, the work mover acts to move planar work in a path parallel to the work-plane, and the cutting plane of the cutter is simultaneously parallel to the direction of said path and inclined to said work-plane.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 3, and 4, for edge-trimming and skiving cutters.

- 433** This subclass is indented under subclass 425. Device in which the cutter is mounted for movement with relation to the means for moving the work.

- (1) Note. Included herein are cutter mountings providing for adjustment of the cutter in cutting position as well as mountings providing for movement of the cutters into and out of a position wherein it will cut work.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 248, for means to adjust a tool in a subclass 202 type of device.
482, for rotatable disc-blades movable into or out of cutting position.
498+, and 504, for rotatable disc-blade cutters adjustable axially.
699.51+, for adjustable mounting for fixed-type cutters.

- 434** This subclass is indented under subclass 425. Device in which the means for moving work includes a work-contacting face area, and in which the cutting edge of the cutter engages said face area during cutting.

- (1) Note. The structure of patents placed in this subclass is similar to that of subclasses 505+ and 509+ in that patents in this subclass may include a rotatable disc-blade (in subclasses 505+) or a fixed cutter (in subclasses 509+) engaging the periphery of a cylindrical anvil. The difference is that in this subclass the cylindrical anvil is rotated by drive means and is claimed as a work-feed (or equivalent term) means, whereas the anvil of subclasses 505+ and 509+ is not claimed as moving the work.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 176+, for devices wherein the work is claimed as deformed around an anvil for cutting the work.
505+, and 509+, and see (1) Note above.

- 435** This subclass is indented under subclass 425. Device in which the means for moving work includes at least two such means cooperating to move the same work, but separated one from the other in a direction transverse to the direction of work movement, and the cutter is located interjacent said two means.

- (1) Note. Included herein are grooved feed rolls and cutters located at the grooves.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 430, for similar structure wherein the cutter is coaxial with and moved by means

common to the work-moving drive means.

435.11 By rectilinearly moving work carriage:

This subclass is indented under subclass 425. Device wherein the work moving means is of rigid construction and is adapted to support the work against gravity and which support moves relative to the tool station along a fixed straight path.

- (1) Note. A miter gage having a portion that rides in a slot in a cutter table is considered to be a work carriage, under the definition of this and the indented subclasses.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 276+, for reciprocating work-mover, wherein the tool engages the work during dwell of intermittent workfeed.
409+, for other rectilinear work-mover means including a work-constrainer.
437.1+, for a cutting device having a rectilinearly moving work carriage and a tool, generally.
730, for a cutting device including a rectilinearly moving work carriage and including means to cause the cutting device to make plural passes through a diminishing workpiece, including means to effect incremental movement toward the plane of cut.

435.12 Angularly adjustable:

This subclass is indented under subclass 435.11. Device including provision to allow the device to be repositioned about an axis.

435.13 Having positive adjustment stop; e.g., link:

This subclass is indented under subclass 435.12. Device including a preset adjustment limiting abutment.

435.14 Having position indicating means:

This subclass is indented under subclass 435.12. Device including digital provision to designate the location of the work.

- (1) Note. An indicator showing the position of a work support also shows the position of the work thereon, and is included herein.

435.15 Pusher engaging rear surface of work:

This subclass is indented under subclass 435.11. Device comprising a member acting to engage a backward facing surface of the work-piece and shove it toward the cutter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 431, for similar structure including means additional to the work-mover or a cutter located adjacent the edged cutter and acting in a direction which is simultaneously parallel to the plane of said edged cutter and perpendicular to the direction of work movement to urge the work upon the edged cutter.
437.2+, for a tool opposing pusher that forces the work toward a cutter; wherein the cut is other than parallel to the direction of movement of the work.

435.16 Having means to actuate pusher:

This subclass is indented under subclass 435.15. Device including a component intended to engage the shoving member to effect movement thereof.

435.17 Hydraulically or pneumatically means:

This subclass is indented under subclass 435.16. Device wherein the component is adapted to utilize gas or liquid under pressure to effect movement.

435.18 Gear or pulley actuated pusher:

This subclass is indented under subclass 435.16. Device wherein the movement is effected by the action the peripheral surface of a rotary, cylindrical member which may include teeth that interfit with cooperating teeth on the pusher or may include a smooth surface that frictionally engages the pusher.

- (1) Note. A gear that drives chain, or a pulley that drives a belt, which in turn, drives a pusher is included herein.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 435.16, for similar structure including a worm or screw actuated pusher.

435.19 Lever, cam, or link actuated pusher:

This subclass is indented under subclass 435.16. Device wherein the movement is effected by the action of a swinging arm, a sliding wedge-like member which may be rotary, or by a pivotal member attached at its end to the pusher.

435.2 This subclass is indented under subclass 425. Device which comprises a continuous web, strand, or series of articulated links which move the work while the work is supported thereby.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

435, for a work moving means comprising two endless conveyors, laterally spaced, and wherein the cutting tool is disposed therebetween.

435.21 Having means to actuate carriage:

This subclass is indented under subclass 435.11. Device including a component intended to engage the work moving means to effect movement thereof.

435.22 Hydraulic or pneumatic means:

This subclass is indented under subclass 435.21. Device wherein the component is adapted to utilize gas or liquid under pressure to effect movement.

435.23 Gear or pulley:

This subclass is indented under subclass 435.21. Device wherein the movement is effected by action of the peripheral surface of a rotary, cylindrical member which may include teeth that interfit with cooperating teeth on the work carriage or may include a smooth surface that frictionally engages the work carriage.

(1) Note. a gear that drives chain, or a pulley that drives a belt, which in turn, drives a pusher is included herein.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

435.21, for similar structure including a worm or screw actuated pusher.

435.24 Adapted to place tension on flaccid member:

This subclass is indented under subclass 435.23. Device wherein the cylindrical member effects tensile force on a flexible strand capable of transmitting only tensile force along its axis, to effect movement of the work carriage to which the strand is connected.

435.25 Lever, cam, or link means:

This subclass is indented under subclass 435.21. Device wherein the movement of the work carriage is effected by the action of a swinging arm, a sliding wedge-like member which may be rotary, or by a pivotal member attached at its end to the carriage.

435.26 On or attached to vehicle:

This subclass is indented under subclass 435.11. Device supported for movement over substantial distances, or adapted to be secured to a carriage which, in turn is movable over substantial distances.

(1) Note. Casters under the frame of a cutting machine is not deemed to support the machine for movement over a substantial distance.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

928, a cross-reference art collection, for a vehicle mounted cutting tool, generally.

435.27 Supported for movement at one side of tool only:

This subclass is indented under subclass 435.11. Device wherein the movable carriage is sustained against gravity entirely on one side of a line extending through the path of the cutter.

(1) Note. A "Shingle cutter" including a horizontally cutting blade and a work carriage there-above wherein all guide structure for the work carriage is above the blade is included herein.

436.1 By feed roller:

This subclass is indented under subclass 425. Device in which the work-moving means itself moves in the arc of a circle in peripheral

engagement with the work, thereby moving the work in a straight path.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

261, for a cutting device that engages a workpiece during dwell of intermittent workfeed with a rotary feed means.

436.3+, for a cutting device with a roller to convey work, generally.

436.15 Pinch rollers:

This subclass is indented under subclass 436.1. Device including another work engaging means of similar configuration to the work-moving means adapted to engage a diametrically opposite surface of the work from the work-moving means to grip the work and enhance the frictional contact of the work-moving means with the work.

436.2 Unattached manual work pusher:

This subclass is indented under subclass 425. Device comprising an implement intended to be grasped directly by and randomly manipulated by an operative and used to shove work toward a cutter.

436.3 Roller:

This subclass is indented under subclass 401. Device in which the work-moving means itself moves in the arc of a circle in peripheral engagement with the work, thereby moving the work in a straight path.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

261, for a cutting device that engages a workpiece during dwell of intermittent workfeed with a rotary feed means.

436.1+, for a cutting device with a roller to convey work wherein the cut is parallel to and during work movement.

SEE OR SEARCH CLASS:

198, Conveyors: Power Driven, subclasses 780+ for a live roll used in a conveyor, generally.

492, Roll or Roller, for a roll, per se.

436.4 Plural independent rollers for feed of plural distinct work:

This subclass is indented under subclass 436.3. Device including of a first roller for advancing a first workpiece and a second roller for advancing a second workpiece.

436.45 Shaped to conform to work:

This subclass is indented under subclass 436.3. Device comprising a roller having a shape other than smooth such that it interfits with the intended material intended to be conveyed thereby.

436.5 With work-supplying reel:

This subclass is indented under subclass 436.3. Device combined with a work supply including a storage spool.

436.55 And provision for selecting feed length:

This subclass is indented under subclass 436.5. Device including provision to predetermine the extent of material to be advanced.

436.6 Continuous conveying during cutting; e.g., straw cutting:

This subclass is indented under subclass 436.3. Device intended to continue conveying the work into the tool station as the cutter functions.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

262, for a cutter and feeder wherein the feeder continues during cutting, but the work is clamped or blocked during cutting.

SEE OR SEARCH CLASS:

241, Solid Material Comminution or Disintegration, for a process or apparatus directed to the cutting or severing of solid material into a number of smaller solid masses, which smaller masses do not have imparted to them any desired or significant shape. As between Classes 83 and 241, the provision of means for (or steps of) retaining an original dimension of the work in the cut up product will exclude a patent for the apparatus (or process) from Class 241.

436.7 Supporting work at cutting station:

This subclass is indented under subclass 436.3. Device wherein the roller sustains the work during cutting.

- (1) Note. Since the roller of this subclass supports the work during cutting, the work must be sufficiently rigid to span the distance from the roller to the tool station.

436.75 Comprising part of cutting station:

This subclass is indented under subclass 436.7. Device wherein the roller is so close to the tool that it sustains the work against the action of the tool.

436.8 Tool and feed roller actuated by common handle:

This subclass is indented under subclass 436.3. Device including a manually grasped portion intended to reposition the cutter and also intended to reposition the feed roller.

436.9 Tool and roller on common movable support:

This subclass is indented under subclass 436.3. Device including a repositionable member for support of the cutter during its operation and including a feed roller also on that same repositionable member.

437.1 Rectilinear movement only:

This subclass is indented under subclass 401. Device in which the work-moving means itself moves in a straight line while engaged with the work.

- (1) Note. Included herein is a feeder that moves in an orbital path, a part of such path being rectilinear and lying in the plane of the work whereby the feeder engages and moves with the work in such rectilinear path, and a part of the feeder path being out of the work plane whereby the feeder retracts for a re-engagement with a different part of the same work. Also included herein is a pusher member maintained in continuous engagement with the work throughout the feed stroke, and the pusher retracts to engage another workpiece.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 276+, for a cutting device including a reciprocating work-mover, wherein the tool engages the work during dwell of intermittent workfeed.
409+, for other rectilinear work-mover means including a work-constrainer.
435.11+, for a cutting device having a rectilinearly moving work carriage and tool adapted to cut parallel to the direction of and during work movement.

437.2 Tool opposing pusher:

This subclass is indented under subclass 437.1. Device comprising a member acting to engage a workpiece and shove it toward the cutter.

- (1) Note. A "back gage" which pushes a stack of sheets of paper into final position for cutting is included herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 431, for similar structure including means additional to the work-mover or a cutter located adjacent the edged cutter and acting in a direction which is simultaneously parallel to the plane of said edged cutter and perpendicular to the direction of work movement to urge the work upon the edged cutter.
435.15, for a tool opposing pusher that forces the work toward a cutter; wherein the cut is parallel to the direction of movement of the work.

437.3 Hydraulically or pneumatically actuated:

This subclass is indented under subclass 437.2. Device including a motor powered by gas or liquid under pressure to effect movement of the conveyor.

437.4 Screw actuated:

This subclass is indented under subclass 437.2. Device wherein the movement is effected by action of the peripheral surface of a rotary, cylindrical member which includes a helical ridge or groove that interfits with a mating portion of the conveyor to effect movement thereof.

437.5 Gear or pulley actuated:

This subclass is indented under subclass 437.2. Device wherein the movement is effected by action of the peripheral surface of a rotary, cylindrical member which may include teeth that interfit with cooperating teeth on the conveyor or may include a smooth surface that frictionally engages the conveyor to effect movement thereof.

- (1) Note. a gear that drives chain, or a pulley that drives a belt, which in turn, drives a pusher is included herein.

437.6 Lever, cam or link actuated:

This subclass is indented under subclass 437.2. Device wherein the movement is effected by the action of a swinging arm, a sliding wedge-like member which may be rotary, or by a pivotal member attached at its end to the conveyor.

437.7 Spring or gravity urged:

This subclass is indented under subclass 437.2. Device wherein pressure is applied to the conveyor by a resilient member or by the action of gravity.

- (1) Note. Included here is a tool opposing pusher positioned vertically above the work so that gravity would advance the pusher, even though there is no specific disclosure of such.

438 This subclass is indented under the class definition. Apparatus provided with passive means which is operative to define or limit the path of movement (i.e., to direct, wholly or partially, the course) or moving work, or to orient such work.

- (1) Note. The mere support or prevention of downward movement of work under the influence of gravity is not significant as a guiding function. An inclined plane or the like, (which is utilized not for mere support of the work, but to conduct it or facilitate its deflection to a different level) has guiding function.
- (2) Note. The “passive means”, in this and indented subclasses, performs its function without the application of power

thereto; it directs, deflects, orients, etc., the moving work without furnishing any propelling force in the general direction of work movement.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 162+, for passive means to guide the product of a cutting operation.
- 270, for a machine of subclass 202 type with work guideway unobstructed on one side to admit large workpieces.
- 279+, for machine of subclass 202 type with means to guide, position, or present work-to-work-feed means.
- 310, for flying support or guide for work in a cutter of the flying type.
- 373, for work guide moving means synchronized with tool stroke.
- 418+, for a work guide associated with a work-mover.

SEE OR SEARCH CLASS:

- 193, Conveyors, Chutes, Skids, Guides, and Ways, appropriate subclasses, for a material guide of general utility.
- 226, Advancing Material of Indeterminate Length, may include a nominal recitation of a supply or take-up coil (e.g., less than a support for such a coil or a cooperative relationship between a tension or exhaust detector* and reel driving or reel stopping means, etc.), subclass 196.1 for a passive guide* combined with a material feeder.
- 242, Winding, Tensioning, or Guiding, subclasses 157+ for a residual guide that directs a strand, subclasses 346+ for a particular guide or guard for an unwinding and rewinding coil to coil machine convertible information carrier (e.g., magnetic tape or photos:graphic film, etc.) cartridge system, subclass 377 for a reeling device with a spring motor having a particular guide structure, subclass 548 for particular guide or guard for convolute winding of material; subclass 566 for an unwinding apparatus having a particular guide or guard, or subclasses 615+ for a residual guide or guard that directs elongated flexible material that may be combined

with more than nominal winding structure.

439 This subclass is indented under subclass 438. Device wherein means is provided to constrain the work to movement about a fixed axis.

- (1) Note. For original placement in this subclass, a patent must claim structure which limits motion of the work to a pivotal or arcuate path by reaction directly on the work itself instead of on a work carrier. The latter type of device will be found in patents placed in subclass 411.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 267, for means to advance work step-by-step in an arcuate path in a cutting machine.
351, for work constrained to swing about a progressively cutting tool during tool stroke.
410+, for means to guide a work carrier in a nonrectilinear path.
411+, and see (1) Note above.

SEE OR SEARCH CLASS:

- 269, Work Holders, appropriate subclasses, for a guide of the type found in this subclass and claimed, per se (i.e., not in combination with significant tool structure).

440 This subclass is indented under subclass 438. Device in which the work guide is constructed as a portion of a tool which does not move through a cutting stroke, or is rigidly attached thereto.

- (1) Note. Although the tool member referred to here does not have a cutting stroke, it may be adjustable or positionable.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 373, for guide means movable in timed relation to a tool stroke, as by being fixed to a moving tool.

440.1 This subclass is indented under subclass 440. Device wherein the stationary tool element is a member of a tool pair*.

440.2 This subclass is indented under subclass 438. Apparatus wherein the passive means either (a) additionally serves, or (b) has additional means associated therewith, to protect the operator or the tool from harm.

- (1) Note. Included herein is a guard which performs the dual function of guiding and guarding.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 860, for guard means attached to a machine frame, and see search notes thereto for additional guard devices.

441 This subclass is indented under subclass 438. Device wherein a work guide structure is fixed to, or connected so as to move upon movement of, an element which supports a tool for rotation or motion through a cutting stroke but which does not itself undergo such rotation or cutting stroke motion.

- (1) Note. The work guide is stationary throughout cutting operations.
(2) Note. A common type of tool carrier is a support and bearing structure for mounting a rotary-disc cutter assembly.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 373, for interrelated tool actuating and work guide moving means.

441.1 This subclass is indented under subclass 438. Device wherein a work guide structure is fixed or linked to a tool guiding element, said element being operative, without application of power thereto, to engage the tool or tool support so as to define or limit the path of movement thereof.

442 This subclass is indented under subclass 438. Device which is arranged to exert a guiding function upon one or more faces or edges of a structure which is disclosed as being temporarily attached to and supported by the work.

- (1) Note. This subclass does not include a guided work carrier or other workholder, for which see subclasses 401+.

Here, the work holds the template or straightedge. That is to say, the template is not a work holder or support; but is merely attached to the work to provide one or more edges for cooperation with guide means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

401+, especially subclasses 410+ and 412+, for means to guide or orient a work carrier relative to a tool station, and see (1) Note above.

565, for a tool which follows the surface of a template.

443 This subclass is indented under subclass 438. Device which facilitates or causes constraint of work movement to a curved path, or which changes the direction of work movement from one rectilinear direction to another.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

410+, for means to guide a work carrier in a nonrectilinear path.

439, for means to guide work in an arcuate path.

445, for a guide means which permits (but does not cause) angling or reorientation of work adjacent a cutting zone.

444 This subclass is indented under subclass 438. Device wherein sufficient guide structure is provided to prevent movement of the work out of a definite path.

(1) Note. Three guide rails spaced apart may be sufficient to confine a rigid workpiece such as a rod or bar, whereas a soft material, such as cloth or fiber may require to be entirely enclosed, to meet the definition.

445 This subclass is indented under subclass 438. Device so constructed and arranged as to present a guiding element of limited extent at or adjacent to a tool zone, and disclosed as (a) enabling an operator to shift or rotate the work at will about the guide element as a fulcrum or instantaneous axis or (b) permitting a control mechanism to do so.

(1) Note. Examples are hand-fed machines for cutting along curved or irregular contours, or for punching decorative designs at a fixed distance from the edges of shoe uppers or other irregular shapes.

446 This subclass is indented under subclass 438. Device which incorporates either (a) an idler roller (or roller-carried band) engageable with passing work, or (b) a guide element which is biased toward a predetermined location by a counterweight or springlike means (either solid or fluid), so that the element may be pushed back by random lateral displacements of passing work but tends to return toward its initial position.

(1) Note. There is usually, but not necessarily, another element, such as a guide or a work-supporting surface, opposed to the movable or yieldable guide element. Such other element may, but need not, be movable or yieldable.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

422, for yieldable means to press work to a work-mover.

447 This subclass is indented under subclass 446. Device in which the movable or yieldable guide element tends to hold moving work in contact with a work-table or other supporting element or assemblage.

(1) Note. The devices found here and in subclass 450 are frequently called "hold-downs". They differ from clamps in that they are not actuated manually or by power means, and in that they do not immobilize the work.

(2) Note. A holddown which is claimed as of utility in freeing a tool from work after a cutting operation (i.e., from product) will be found in subclass 145.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

145+, for means to move product out of contact with a tool; and see (2) Note, above.

450, for a nonyieldable holddown.

- 452+, for work clamping means associated with a cutter.
- 448** This subclass is indented under subclass 438. Device wherein the guide structure presents two or more elements which as disclosed are effective to restrain movement of the work in different directions.
- (1) Note. Example: An angle-iron may be disclosed as arranged to prevent deflection of the work in two directions; e.g., upward and to the right (or left).
 - (2) Note. A U-shaped trough may be used to confine the work in all directions except one.
 - (3) Note. The original copy of a patent directed to a cutter and a plurality of guide elements which are effective to restrain movement in the same direction will be placed in subclass 438.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
438, and see (3) Note above.
- 449** This subclass is indented under subclass 448. Device wherein at least two of the guide elements are effective in contrary directions.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
420, for opposed guide means additional to work-moving means.
- 450** This subclass is indented under subclass 438. Device wherein a guide element is upwardly spaced from and cooperates with a work table or equivalent work support to prevent movement of the work upwardly off the support.
- (1) Note. Such devices are commonly called holddowns. They may be adjusted to accommodate different thicknesses of work, but are not actuated so as to clamp the work and prevent its movement along the work support. See (1) Note under subclass 447, above.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
111, and particularly 145, for means to move product of contact with a tool.
447, for yieldable or movable holddown.
452+, for a work clamp associated with a tool station.
- 451** This subclass is indented under the class definition. Apparatus provided with a device to maintain or retain the work in fixed position relative to immovable parts of the apparatus.
- (1) Note. This subclass (451) includes original patents for cutting devices characterized by such immobilizers as holding pins, magnets, suction means, and similar devices which do not hold work by frictional force developed between opposed movable jaws.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
374+, for a work immobilizer which is interrelated with tool actuating means.
409, for a work carrier, which may be provided with a gripper or other work-immobilizing means.
446, and 447, for guide comprising jaws with work-engaging rollers which permit movement of the work.
- 452** This subclass is indented under subclass 451. Device which comprises a plurality of opposed solid jaws or surface elements which are made effective, by movement of one or more of said jaws or surface elements, to grip the work frictionally and hold it in a desired position fixedly with respect to a tool station.
- (1) Note. To be classified in this subclass, a moving cutting tool must be claimed. If only a work holder is claimed, or a work holder and stationary cutter in combination, the patent will be classified in Class 269, Work Holders.
 - (2) Note. A clamp must be actuatable by the application of energy either to open it or to close it. (It is not a passive yielding guide or snubbing device).

- (3) Note. A device which is described as serving as a “stripper” as well as a clamp or hold down, will be found in subclasses 111+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 111+, and see (3) Note above.
 277, for a feed gripper associated with a machine which cuts work during dwell of work-feed.
 375+, for a work clamp which is interrelated with tool actuating means.
 435.11+, for a cutting device with means to convey work and with a work gripper, wherein the cut is made parallel to and during work movement.
 437.1+, for a cutting device with means to convey work and with a work gripper, generally.
 447, and 450, for a “holddown” opposed to a work-supporting table but not actuated positively to clamp the work.
 567, for means to bind work against a work-moving tool.

SEE OR SEARCH CLASS:

- 269, Work Holders, appropriate subclasses particularly subclasses 86+ for a work holder provided with a clamp or clamps; and see (1) Note, above.

- 453** This subclass is indented under subclass 452. Device which (a) is actuated in timed relationship with another portion of the machine which has other than cutting or work-clamping function, or (b) affords to or receives from such other portion direct support (either vertical or lateral, continuous or transitory), or (c) is structurally related to such other portion, as by having parts in common therewith.

- (1) Note. A clamp combined with (i.e., synchronized with) an actuated tool would be found in subclasses 375+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 264, for means to bind work against a moving tool while the latter moves the work against a cooperating tool.

- 375+, for interrelationship between clamp and a tool during its cutting stroke, and see (1) Note above.

- 454** This subclass is indented under subclass 453. Device wherein the other element constitutes passive means which engages a movable tool or tool support or bearing means mounted on either the tool or tool support, to direct, wholly or partially, the course of movement of such tool or tool support in its cutting stroke.

- 455** This subclass is indented under subclass 454. Device wherein the other element functions as a guide for a tool which moves substantially parallel to the length or width of the work and engages the entire thickness thereof simultaneously during at least the major portion of its cutting stroke.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 353, and 614, for a traveling cutter, generally.
 483+, for traveling cutter of the rotary-disc type.

- 456** This subclass is indented under subclass 453. Device in which a movable clamp jaw, while in actuated or work-clamping position, serves also as a fixed tool* or tool support*.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 383+, for a clamp jaw of the type of this subclass but claimed as timed with the movement of a tool in its cutting stroke.

- 457** This subclass is indented under subclass 452. Device including means which necessarily results in, or whose disclosed purpose is to permit, successive applications of force, including gravitational, to the clamp in its clamping stroke.

- (1) Note. Included in this subclass are disclosures of clamps which are provided with separate actuating linkages or power trains, one of which is intended to be utilized initially for rapidly moving a clamp jaw to approximate position.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 379, for interrelated tool actuating means and means to provide plural steps in clamping stroke.
- 458** This subclass is indented under subclass 452. Device comprising, in addition to the actuating means, structure which either tends to promote and maintain parallelism or other definite angular relationship of the jaws, or which permits at least one jaw to adjust itself in position as it engages the work.
- (1) Note. The equalizer means must be distinct from the actuating means. Example: A torsion rod with rack-and-pinion connections to both ends of the clamp bar.
- (2) Note. A mere pivotal mounting of a clamp jaw, if it is intended to permit self-alignment, is included.
- 459** This subclass is indented under subclass 452. Device wherein means is provided which tends to (a) maintain the jaws in, or to return them to, a definite position; or (b) enable the jaws to remain in their last position if not subjected to operating force or resistance of work.
- (1) Note. Includes a clamp with cantilever spring jaws or jaw-carrying arm.
- (2) Note. A biased or counterbalanced clamp, if actuated manually by direct hand pressure or through linkage, or by conventional power means, will be classified here rather than in "manual" or "power" actuation subclasses.
- 460** This subclass is indented under subclass 452. Devices including clamp-actuating means which comprises a force-responsive (i.e., resilient or slipping) portion forming part of the force-transmitting train which moves the clamp toward its applied condition, such portion serving to limit the force which can be exerted on and by the movable clamp jaw.
- (1) Note. This subclass includes disclosures of fluid actuated clamps which have yieldable drives. Example: compressed air drive, or hydraulic with relief valve).
- There must be force-limiting structure present.
- 461** This subclass is indented under subclass 452. Device wherein the clamp is driven by fluid pressure means, without specific provision for yieldability or force-limiting in the drive train, the fluid not being resilient or yieldable, per se.
- (1) Note. A plain hydraulic drive is included here. A compressed air drive is inherently yieldable and so comprises subject matter of subclass 460.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 460, and see (1) Note above.
- 462** This subclass is indented under subclass 452. Device provided with structure (additional to that of the clamp's driving train) for the purpose of holding the clamp in a given location (usually, that in which it is closed on the work) when the actuating force is not present.
- (1) Note. A device of the type found in this subclass may comprise (for instance) pawl-and-ratchet means, a friction brake, or a chock, effective to retain the clamp jaw in an actuated position but not to move it there.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 459, for clamp with biasing or counterbalancing means.
 463, for clamp with self-binding drive (worm or wedge).
- 463** This subclass is indented under subclass 452. Device wherein the actuating transmission becomes frictionally held in position upon cessation of the actuating power, by the characteristics of the transmission proper.
- (1) Note. Included in this subclass are patents to clamps with worm gearing or screw-and-nut drives (sometimes called "irreversible" drives), and drives comprising an actuating cam or wedge if of comparably high mechanical advantage.
- (2) Note. A manually-operated wedge drive for a clamp would be classified here

rather than in “manual actuation” if it is evident from the disclosure that it is intended to be self-binding.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

462, for a brake, latch or lock provided to hold a clamp in position.

464 This subclass is indented under subclass 452. Device whose clamp is actuated by human power, applied to a force-transmitting linkage from a handle, crank, or pedal.

(1) Note. This subclass includes manually actuated eccentric cams, toggles, wedges, etc., in clamp drives, wherein it is not taught to be a self-binding drive. Manually actuated clamps also appear in most of the subclasses (of this group) collateral with and superior to this one.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

452+, for a clamp actuated by direct hand pressure.

459, for some conventional manually-actuated clamps which are characterized by being biased or counterbalanced.

465 This subclass is indented under subclass 452. Device including claimed particular conformation of work-engaging portion.

(1) Note. A clamp comprising a jaw with spaced segments, removable or adjustable segments, curved, inclined or cushioned face, etc., and with no specific actuating means is classified here.

SEE OR SEARCH CLASS:

81, Tools, subclasses 418+ for particular conformation of plier-jaw faces.

269, Work Holders, subclasses 257+, for patents to a jaw feature and/or a jaw attachment for a work holder.

466 This subclass is indented under subclass 452. Device which is associated with structure, or which comprises structure, enabling change or variation of the jaw motion or of the location of the clamp as a whole.

466.1 This subclass is indented under subclass 451. Device which comprises means to restrain the work against movement in at least two directions, one of which is vertical, and wherein said means has at least one elongated opening in the surface thereof disclosed as being for the reception of a cutting instrumentality.

(1) Note. The opening may merely serve as a guide for the cutter or it may cooperate with the cutter to produce a shearing* cut.

467.1 Work-stop abutment:

This subclass is indented under subclass 451. Device comprising a firm obstacle to block work movement and thereby position the work for cutting.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

163, for a cutting machine with a product handling means comprising an abutment in the path of the product being moved by a work-feeding means.

166, for a cutting machine with a product handling means comprising an abutment interposed in the path of free fall or flight of the product.

212, for a cutting machine wherein the tool engages the work during dwell of intermittent work-feed, having a work sensing means to initiate tool feed including a work-stop abutment.

253+, for a cutting machine wherein the tool engages the work during dwell of intermittent work-feed including means to produce a plurality of work-feed increments per tool cycle and including supplemental work-feed means comprising an abutment adapted to be engaged by a surface on the work.

268+, for a cutting machine wherein the tool engages the work during dwell of intermittent work-feed including an abutment used to position the work being fed with respect to the cutter.

391+, for a cutting machine including a work-stop abutment actuated in timed relation to the tool stroke.

419, for a cutting machine including means to convey work relative to the tool sta-

tion with a work-stop abutment to engage and orient the work relative to the tool station.

- 468** This subclass is indented under subclass 467. Device wherein means are included to determine accurately the work positioning by means of indentations, numerals, rule markings, etc.

(1) Note. Normally said means are on or near the work support.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

522, for cutting device with signal, scale or indicator, in general.

468.1 Normal to plane of cut:

This subclass is indented under subclass 467.1. Device wherein the cutting instrumentality cuts the workpiece to form a prescribed flat surface and the firm obstacle functions by engagement with a workpiece on a surface at a right angle to the flat surface, wherein the formed flat surface extends normally to the surface at right angles thereto.

- (1) Note. The "obstacle" of this subclass may extend along a line normal to the flat surface, or it may be of limited extent but engage a portion of the workpiece that extends along a line normal to the flat surface.
- (2) Note. Neither a hole punch nor a button hole cutter (that cuts a short slit) is included herein because the line of cut does not extend to the edge of the work being engaged by the work-stop abutment.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

468.8+, and 468.93+, for a cutting device having a work-stop abutment extending normally (a) to a tangent of a curved cutting edge, or (b) to one of the edges of a punch having a plurality of cutting edges.

468.2 Adjustable:

This subclass is indented under subclass 468.1. Device including provision to change the position of the plane of cut with respect to the nor-

mal work-stop abutment, or with respect to another work-stop abutment.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

468.8, for a work-stop abutment that is adjustable with respect to a cutting tool, wherein the tool cuts an arcuate path through the work such that a tangent of that path is normal to the work-stop abutment.

468.93, for a work-stop abutment combined with a cutting tool, wherein the tool cuts an arcuate path through the work, such that a tangent of that path is normal to the work-stop abutment.

468.3 Angularly relative to plane of cut; e.g., miter:

This subclass is indented under subclass 468.2. Device including provision to change the angle of intersection of the plane of cut with respect to a work-stop abutment to something other than normal.

- (1) Note. In the device of this subclass, at least one work-stop abutment is normal to the plane of cut in at least one angular adjustment.

468.4 With traversing cutter guide; e.g., cut-off saw:

This subclass is indented under subclass 468.1. Device provided with means to provide for transport of a cutting instrumentality and its driving means across the workpiece to effect the cutting action.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

468.3, for a traversing rotary cutter that is adjustable relative to the plane of cut.

468.5 Collapsible:

This subclass is indented under subclass 467.1. Device wherein the work-stop abutment is constructed to disable under certain conditions of the device.

- (1) Note. The work-stop abutment may be disabled when a press descends to allow movement of the press against the workpiece, or it may be disabled by excessive force on the abutment, in order to pre-

vent damage to the abutment or to the workpiece.

468.6 Retractable:

This subclass is indented under subclass 467.1. Device wherein the work-stop abutment is constructed to be temporarily moved out of operative position at the will of the operative.

- (1) Note. The abutment of this subclass may comprise retractable indexing device.

468.7 Adjustable:

This subclass is indented under subclass 467.1. Device wherein the work-stop abutment is constructed to be repositioned with respect to the plane of cut.

468.8 Having curved cutting edge to make arcuate cut, plural nonaligned intersecting cutting edges, or spaced punches:

This subclass is indented under subclass 468.7. Device including on a single tool holder (a) a cutting edge that extends along an arcuate cutting plane when viewed normally to the work surface, (b) a first and a second cutting edge positioned on the same tool holder such that they cut the work along a continuous, but not straight path, or (c) spaced, generally aligned cutting edges that do not extend to the edge of the work.

- (1) Note. A device having a curved cutting edge extending in part normal to the work-stop abutment is included in this and the indented subclass, as is a device having a first and a second cutting edge that serve together to cut a notch in the workpiece, wherein one of the edges extends normal to the work-stop abutment.

468.9 Spaced edges:

This subclass is indented under subclass 468.8. Device including a first cutting edge that engages the workpiece to effect a first cut and including a second cutting edge that engages the workpiece to effect a second cut, wherein the first cut and the second cut are not connected.

468.93 Having curved cutting edge to make arcuate cut, plural nonaligned intersecting cutting edges, or spaced punches:

This subclass is indented under subclass 467.1. Device including on a single tool holder, (a) a cutting edge that extends along an arcuate cutting plane when viewed normally to the work surface, (b) a first and a second cutting edge positioned on the same tool holder such that they cut the work along a continuous, but not straight path, or (c) spaced, generally aligned cutting edges that do not extend to the edge of the work.

- (1) Note. A device having a curved cutting edge extending in part normal to the work-stop abutment is included in this and the indented subclass, as is a device having a first and a second cutting edge that serve together to cut a notch in the workpiece, wherein one of the edges extends normal to the work-stop abutment.

468.94 Spaced edges:

This subclass is indented under subclass 468.93. Device including a first cutting edge that engages the workpiece to effect a first cut and including a second cutting edge that engages the workpiece to effect a second cut, wherein the first cut and the second cut are not connected.

469

This subclass is indented under the class definition. Device provided with a cutter comprising a circular member mounted for rotation (unidirectional or oscillatory) about its central axis of rotation, having a work-cutting edge on or adjacent the periphery of said member, which edge cuts in a plane which is both substantially co-extensive with a radial face (or a radial plane) of said member and perpendicular to the axis of rotation of said member, and, as disclosed, cuts in a continuous line during the cutting operation of the cutter, and including (a) a holder for mounting or supporting said cutter for rotation, which holder does not partake of said rotation, or (b) a second cutter in close proximity to and in cooperative cutting relation with said circular cutter whereby work passed between the cutters in contact with the edge of the circular cutter and a mating edge or surface

of the second cutter will be cut through thicknesswise in the plane of cutting.

- (1) Note. The individual patents directed to devices of the type described in part (A) of the above definition are collected or filed in this generic subclass (469).
- (2) Note. With respect to part (a) of the above definition, patents placed herein differ from the patents in Tools, subclasses 651+, especially disc type, subclass 676, in that the claims of the patents herein placed include the means about which the tool rotates, whereas tools in subclass 676 include only the tool and parts partaking of all the tool movements. For example, if the claimed disclosure includes a shaft fixed against rotation, about which shaft a disc cutter rotates, the patent would be placed herein; but if the claimed disclosure includes a shaft, to which shaft a disc cutter is secured, whereby both elements may rotate, but no fixed or bearing support for the shaft is claimed, the patents would be placed in subclasses 651+, especially subclass 676.
- (3) Note. With respect to part (a) of the above definition, a holder for so mounting or supporting a rotatable circular member as defined in the main definition will, in the further description of this and indented subclasses, henceforth be termed a "Tool carrier".
- (4) Note. With respect to part (b) of the above definition two cooperating cutters forming one line of cutting, at least one of which cutters is a rotatable circular member as defined will, in the further description of this and indented subclasses, henceforth be termed a "Tool pair".
- (5) Note. With respect to part (b) of the above definition, the second cutter may be a disc-blade similar to the circular cutter defined, or may be a section of a circular cylinder (the disc-blade cooperating with the peripheral surface of the cylinder, see subclass 505 for example) or may be a flat anvil surface or ledger

blade edge across which the disc-blade moves, (see subclasses 485+ for example), or may partake of nonrotary movements or no movement (see subclass 508 for example), or may be any other part with which the disc-blade as defined cooperates to cut work thicknesswise.

- (6) Note. With respect to part (b) of the above definition, (i.e., Tool pair), the definitions of the subclasses indented hereunder are written in terms of one tool pair, that is, one disc-blade cutter cooperating with one backup element (anvil, cylinder, other-disc-blade, etc.) whereas as disclosed and claimed there may be a plurality of disc blades on a common axis (or, in the case of a cylindrical anvil of subclass 505, a single anvil having a peripheral surface common to plural discs against which surface all of the disc-blades are in cooperative relationship).

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 284, for a "flying" cutter and see (4) Note in subclass 284.
- 425+, for a device having a disc-blade tool combined with means to feed work to the tool.
- 523+, for a cutter having axially extending edges.

SEE OR SEARCH CLASS:

- 407, Cutters, for Shaping, for a milling cutter.

471 This subclass is indented under subclass 469. Device including means adjacent the defined cutter for sustaining the work against the force of gravity in the vicinity of the cutter or against a radial force exerted by the cutter action on the work.

- (1) Note. For a patent to be placed herein, the work-supporting function of a table or other element must be recited in the claim or be clearly inferred from the context of the claim. For patents in which a table is claimed as supporting a guide for a tool carrier, see subclasses 485+.

(2) Note. For other devices including a cutter and a related work table or work-support, see the subclasses indented under subclass 425.

(3) Note. Included in the indented subclasses are patents in which the cutter comprises a radial face and a frusto-conical or cylindrical surface, in which the surface is claimed as a work-supporting surface. A disc-blade and cylindrical backup anvil, combination, wherein the cylindrical surface is, in effect, a cutting element as well as a work-supporting surface, is not proper for this subclass; see subclasses 505+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

425+, for other work-supports and see (1) Note above.

484+, and see (1) Note above.

505+, for tools including a cylindrical work-supporting surface; and see (2) Note above.

SEE OR SEARCH CLASS:

269, Work Holders, appropriate subclasses, for work holders, per se.

471.1 This subclass is indented under subclass 471. Device provided with a plurality of cutters which are movably mounted in such a manner that each cutter moves into a cutting zone with respect to the work-support after another cutter has moved away from the same cutting zone.

471.2 This subclass is indented under subclass 471. Device in which the tool and tool carrier are movable relative to the work-support means during the cutting.

471.3 This subclass is indented under subclass 471.2. Device provided with means for adjusting the tool angularly relative to the work-support means.

(1) Note. This subclass includes a device in which the tool and/or work-support means are angularly adjusted. It is not necessary for the adjustment to result in the tool axis intersecting the work-support means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

473, for a device in which the tool may be angularly adjusted relative to a previous position.

477+, for a rotary disc tool which is adjustable relative to the work support.

486.1, for a device in which the rotary tool carrier reciprocates rectilinearly and which the path of reciprocation can be adjusted angularly, relative to its previous path.

472 This subclass is indented under subclass 471. Device in which the relative positions of the cutter and the work-support means are fixed in a position, or capable of adjustment to a position, and that the axis of the cutter intersects the work-support means.

473 This subclass is indented under subclass 472. Device provided with means to change the angle between the work-support means and the axis of the cutter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

471.3, for a device in which a rotary disc tool may be angularly adjusted relative to a previous position.

477+, for a support otherwise adjustable with respect to its cooperating tool.

486.1, for a device in which the rotary tool carrier reciprocates rectilinearly and in which the path of reciprocation can be adjusted angularly, relative to its previous path.

474 This subclass is indented under subclass 471. Device in which the means for sustaining the work is mounted for movement in a single direction only.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

411+, for rotatable work-holder associated with cutter.

434, for structure in which an anvil is driven to move work in contact with the anvil, and having a disc-blade in contact with the anvil to cut work.

475 This subclass is indented under subclass 474. Device provided with means other than the cutter to urge the work toward the work-support means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

422+, for means to press work to work-mover.

431, for means to press work to cutter.

476 This subclass is indented under subclass 475. Device in which the means to urge the work toward the work-support means is mounted on an axis coincident with the cutter axis.

477 This subclass is indented under subclass 471. Device provided with means to change the positional relationship of the work-support means and the cutter, for example, either by varying the space between the work-sustaining means and the cutter axis, or by oscillating the table about an axis parallel to the cutter axis, or both.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

471.3, for a device wherein the tool moves relative to the work-support during cutting and may be angularly adjusted relative to the work-support.

473, for adjustable angularity of support and tool.

486.1, for a device in which the tool may be angularly adjusted relative to a previous position.

477.1 This subclass is indented under subclass 477. Device provided with means for adjusting the tool relative to the work-support means.

477.2 This subclass is indented under subclass 471. Device in which the work-support means is provided with a slot or groove for the tool.

478 This subclass is indented under subclass 469. Device provided with a hood or casing or other protective member in close spaced association with a rotatable cutter to prevent harm to the tool operator or to prevent damage to the cutter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

398, and 544+, for other guards.

SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, subclass 609 for other guards for rotatable members.

474, Endless Belt Power Transmission Systems or Components, subclasses 144+ for a guard or housing for a belt and pulley drive system.

479 This subclass is indented under subclass 469. Device provided with a plurality of tool pairs, and including (a) means to move one tool pair as a unit into cutting position with respect to work and simultaneously remove one other tool pair from cutting position; or (b) means to move at least one of the cutters of a tool pair, along its individual path, into cooperative cutting relation with respect to its coacting cutter and into cutting position with respect to work, and to remove simultaneously at least one cutter of another tool pair from cooperative cutting relation and cutting position.

(1) Note. See (4) Note of subclass 469 for definition of "Tool pair".

480 This subclass is indented under subclass 479. Devices (especially part (b) of the definition) in which the movable cutter of each of plural tool pairs cooperates to cut with the same coacting cutter (e.g., anvil).

481 This subclass is indented under subclass 469. Device in which a carrier means, for mounting a cutter, is provided with structure claimed as capable of disassembly or removal, whereby the cutter may be inspected, removed, replaced or substituted.

(1) Note. For a patent to be placed herein, the cutter removal function of the carrier must be recited in the claim or be clearly inferred from the content of the claim and supported by the disclosure.

(2) Note. Since it is inherent in a device wherein the cutters of a tool pair are separable, as exemplified by the patents of subclass 482, that one cutter may be

replaced while separated from the other cutter, further search should include subclass 482.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

482, and see (2) Note above.

SEE OR SEARCH CLASS:

483, Tool Changing, subclasses 31+ for a rotary spindle machine tool combined with means to transfer a tool having specific mounting features.

482 This subclass is indented under subclass 469. Device provided with means to move at least one of the cutters of a tool pair into and out of cooperative cutting relation with respect to the other cutter of said tool pair.

(1) Note. See (4) Note of subclass 469 for definition of "Tool pair".

(2) Note. To be classified herein, a patent must include disclosure of a movement of one cutter away from and out of cutting relation with respect to the other cutter of the tool pair (this movement usually being for the purpose of permitting the work to be threaded through a cutting zone). A mere adjustment of one cutter relative to another cutter while they remain in contact with or in cooperative cutting relationship with each other will not suffice for placement in this subclass, but will be found in subclasses 503, 504 and 507 below.

(3) Note. The separation of the cutters one from the other may also be for the purpose of inspecting, removing, replacing or substituting one or both of the cutters. For other such devices, see subclass 481.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

481, and see (2) Note above.

503, 504 and 507, and see (1) Note above.

483 This subclass is indented under subclass 469. Device (especially part (a) of the definition) provided with means to permit movement of the tool carrier and the cutter mounted thereon while the cut is being made.

(1) Note. See (3) Note of subclass 469 for the definition of "Tool carrier".

SEE OR SEARCH THIS CLASS, SUB-CLASS:

471.2+, for a device provided with means to support work and means to permit movement of the tool carrier and cutter while the cut is being made.

SEE OR SEARCH CLASS:

242, Winding, Tensioning, or Guiding, subclass 525.1 and 525.2 for a material slitter positionally related to a surface of a coil being wound and increasing in diameter as material is collected.

484 This subclass is indented under subclass 483. Device provided with means to prevent more than one cutting stroke of the cutter and requiring an external means to initiate another cutting stroke.

(1) Note. Included within the meaning of the term "cutting stroke" is the retraction of the tool carrier through its noncutting movement to a position from which a subsequent cutting stroke is to be initiated.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

203+, for a cutting device of the subclass 202 type wherein the drive is unicyclic.

524+, for unicyclic tool moving means.

485 This subclass is indented under subclass 483. Device in which the tool carrier is movable in a straight-line to-and-fro course of movement.

(1) Note. Included herein is a tool carrier which is moved by being grasped by the tool operator directly.

(2) Note. To fall into this subclass, the carrier must have a guide associated therewith for restricting its movement. For tools of similar nature, but capable of random, unrestricted movement over a work-table, see Class 30, subclass 263.

SEE OR SEARCH CLASS:

30, Cutlery, subclasses 263+ and see (2) Note above.

486 This subclass is indented under subclass 485. Device provided with means to change the course of movement of the tool carrier.

486.1 This subclass is indented under subclass 486. Device in which the course of movement can be changed to a position angularly related to the previous course of movement.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

471.3, for a rotary-disc tool which may be angularly adjusted relative to a previous position.

473, for a rotary-disc tool in which the tool axis and the work supporting surface are angularly adjustable relative to each other.

477+, for a rotary-disc tool which is adjustable relative to the work support.

487 This subclass is indented under subclass 485. Device provided with means to cause the tool carrier to move to-and-fro in a straight line.

(1) Note. A linkage for converting a motion of a limb of the tool operator into a rectilinear movement of the carrier would be classified here.

(2) Note. This subclass is inclusive of patents in which a cutter (or a plurality of cutters) moves in the direction of the thickness of the work, as well as patents in which a cutter moves broadside of the work, parallel to the surface of the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

428, for means to move tool carrier during cutting.

523+, for other means to move a tool carrier during or for cutting.

488 This subclass is indented under subclass 487. Device also including means to effect rotation of the cutter in its tool carrier.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

489, for tool rotating means in which the carrier is moved manually, and see (2) Note under subclass 491.

489 This subclass is indented under subclass 485. Device provided with means to effect rotation of the cutter in its tool carrier.

(1) Note. Included herein are patents in which a limb of the tool operator directly effects carrier reciprocation, and that reciprocation effects cutter rotation through rack and pinion or other equivalent linkage.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

488, for tool rotating means where the carrier is mechanically moved, and see (2) Note under subclass 491.

490 This subclass is indented under subclass 483. Device in which the cutter holder moves (or is moved) in a path of movement which path is in the arc of a circle, either to-and-fro, or in the same direction through 360°.

491 This subclass is indented under subclass 469. Device provided with means to effect rotational movement of the cutter (either unidirectional or to-and-fro in the arc of a circle).

(1) Note. This subclass excludes patents in which one cutter is frictionally rotated by mere contact of the cutting edge of the cutter with the cutting edge of another cutter. For examples of this type of patent see subclasses 485+, 486+ and 487+.

(2) Note. Other patents which include means to rotate the cutter are to be found in subclasses 426+ in which the cutter is driven by or with the work moving means, and in subclasses 488 and 489 in which the cutter is rotated by or with the carrier moving means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

426+, 488 and 489, and see (2) Note above.

- 485, 486+ and 487+, and see (1) Note above.
- 492** This subclass is indented under subclass 491. Device provided with a tool pair, and including means to effect rotation of both cutters of the tool pair.
- (1) Note. See (4) Note of subclass 469 for the definition of a "Tool pair".
- 493** This subclass is indented under subclass 492. Device provided with means to effect a rate of rotation of one of the cutters unequal to the rate of rotation of the other cutter.
- 494** This subclass is indented under subclass 492. Device provided with means to alter the rate of rotation of one or both of the cutters.
- 495** This subclass is indented under subclass 469. Device (especially part (b) of the definition) in which each cutter of a tool pair is mounted for rotation about its axis.
- (1) Note. See (4) Note of subclass 469 for the definition of a "Tool pair".
- (2) Note. Included in this and indented subclasses are patents reciting carrier means for holding or mounting the cutters, for example, a separate carrier for each cutter or a carrier common to both cutters.
- 496** This subclass is indented under subclass 495. Device in which the axes of the cutters are not parallel.
- (1) Note. In the patents placed herein the angular relationship is rarely recited precisely as exemplified below, but this relationship usually falls into one or more of the following categories or types:
- (a) the cutter axes lie in a common plane, but the axes are not parallel to each other, hence the axes converge to a common point;
- (b) the cutter axes lie in planes which are separate, not in a common plane, but are in planes which are parallel to each other;
- (c) the cutter axes lie in planes which are separate, not in a common plane and not parallel to each other. A distinguishing feature of all the patents placed herein, or in the indented subclass, lies in the fact that the cutter axes, if projected (in the sense of the term as used in descriptive geometry) on to a common plane, will intersect.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
472+, for structure in which the cutter axis is oblique relative to a work support.
- 497** This subclass is indented under subclass 496. Device provided with means to vary the angle between the axis of one cutter and the axis of the other cutter.
- 498** This subclass is indented under subclass 495. Device in which both cutters of a tool pair are adjustable along the axes of the cutters.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
504, for means to adjust one cutter axially relative to the other cutter of a tool pair.
- 499** This subclass is indented under subclass 498. Device provided with mechanism to effect the adjustment of both of the cutters of a tool pair simultaneously, or provided with mechanism to effect the adjustment of one of the cutters of a tool pair and with structure which permits the axial movement of the other cutter of the same tool pair.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
428, for means moving tool carrier during cutting.
- 500** This subclass is indented under subclass 495. Device provided with two cutters, in which each of the cutters has a peripheral cutting edge defined by the junction of a radial plane and a circular cylinder, both the plane and the cylinder being generated about the axis of said cutter, in which the axes of said cutters are spaced apart a distance less than the sum of the radii of

the respective cutting edges, and the radial planes of said cutters substantially coincide.

- (1) Note. A drum is equivalent to a disc if only the cutting edge at the end thereof is claimed.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

430, for structure otherwise similar but in which the periphery of a driven circular cylinder moves the work.

501 This subclass is indented under subclass 500. Device provided with means to urge one of the cutters towards the other cutter in a direction parallel to the axis of the cutters.

502 This subclass is indented under subclass 501. Device including means to adjust the urging means whereby the force between the cutters is varied.

503 This subclass is indented under subclass 500. Device provided with means to adjust the space between the axes of the cutters.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

482+, for other means to move the cutter axes apart or together.

504 This subclass is indented under subclass 495. Device in which one cutter of tool pair is movable or adjustable relative to the other along the axis of said adjustable cutter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

482+, for means to separate the cutters axially.

498+, for means to adjust both cutters of a tool pair.

501+, for means to urge the cutter axially.

505 This subclass is indented under subclass 495. Device in which one of the tools is a rotatable disc-blade cutter as defined in the definition of subclass 469 and the cooperating tool is a rotatable circular cylinder, the peripheral surface of which cylinder is smooth.

- (1) Note. Included herein are patents involving structure to urge the disc and the anvil toward one another.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

434, for structure in which an anvil is driven to move work in contact with the anvil, and having a disc-blade in contact with the anvil to cut work.

509+, for similar structure including a smooth or peripherally grooved anvil roll and an edged, nonrotatable, non-cyclic blade, and see (2) Note to subclass 509.

506 This subclass is indented under subclass 505. Device provided with means tending to force the disc and the anvil one toward the other, and including means to change the force exerted between the disc and anvil.

507 This subclass is indented under subclass 495. Device provided with means to effect a change in the spacing between the cutters, particularly between the axis of the cutters.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

482, for means to separate the cutters; e.g., to permit threading of the work therebetween, and see (1) Note in subclass 482.

503, for means to adjust the spacing between cutter axes which cutters comprise contacting, overlapped discs. Where the cutters of a tool pair do not contact each other, even though they overlap, the patents will be found in this subclass (507).

508 This subclass is indented under subclass 469. Device in which a rotatable disc-blade cutter as defined therein cooperates with a stationary or movable backup tool.

- (1) Note. The backup tool may be a planar or grooved platen, or a straight or curved ledger-blade, either fixed or movable, so long as the movement of the tool is not in an arc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

485+, for rotatable disc-blade cutter on a reciprocable tool carrier, the cutter cooperating with a fixed ledger blade.

- 508.1** This subclass is indented under subclass 469. Device wherein the cutter is mounted or supported in said holder in such manner that said cutter may be moved into or out of a cutting relationship or zone with respect to the path normally traversed by a work piece during cutting.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

471.1, for a rotatable disc cutter-type machine in which a plurality of cutters is mounted in such a manner that each cutter moves into a cutting zone after another one of said cutters has moved away from the same zone.

- 508.2** This subclass is indented under subclass 469. Device wherein means are provided to effect a change in the position of the tool relative to its tool holder, or means to effect a change in the position of the tool carrier.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

482, for means to separate the elements of a disc tool pair.
498+, for a rotatable tool pair which is axially shiftable.
507, for elements of a tool pair which are adjustably spaced.

- 508.3** This subclass is indented under subclass 508.2. Device wherein tools are spaced axially of one another along a common holder or axis, and means are provided to change the position of one or more tools relative to one another along said holder or axis.

- 509** This subclass is indented under the class definition. Device provided with two cutter members in close proximity to, and in cooperative cutting relation with, each other, in which one member comprises a surface mounted for rotation about an axis and, as disclosed, forming a contacting or backup means positioned on one face of work and the other member comprises a

blade having a work cutting edge positioned on the opposite face of work, which edge contacts said surface to cut work thickness-wise from face-to-face of work.

- (1) Note. This subclass is similar to subclasses 505+ above, in that both subclasses provide for patents including a rotatable anvil and a fixed-type cutter. In subclasses 505+ the anvil is a smooth cylinder and the cutter is a rotatable disc blade. In this subclass (509) the anvil is a cylinder with either a smooth or a peripherally grooved surface, and the cutter is an edged, nonrotatable, noncyclic blade, the blade either contacting the periphery of a smooth cylinder or in close proximity to the grooves of a grooved cylinder.
- (2) Note. For similar structure wherein the anvil is claimed as a means to feed the work, see subclass 434.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

434, and see (2) Note above.
505+, and see (1) Note above.

- 510** This subclass is indented under subclass 509. Device including means to move the axis of the rotatable surface.

- (1) Note. Included in this and indented subclasses are patents disclosing cigar wrapper cutters, in which a leaf of tobacco is placed upon a contoured blade having an upstanding edge and an anvil travels across the work, the anvil rotating about its axis as its axis moves in a plane parallel to the edge of the blade, thus forming the work upon the edge to cut the work.
- (2) Note. For patents in which the operation is reversed, that is, the anvil rotates about a fixed axis, and the work, held on a movable, contoured, edged blade, is moved with the blade past the rotatable anvil, see subclass 284.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

284+, and see (2) Note above.

- 511** This subclass is indented under subclass 510. Device in which the axis moves in the arc of a circle.
- 512** This subclass is indented under subclass 510. Device provided with at least two rotatable surfaces, each rotatable about a separate (i.e., non-coextensive) axis.
- (1) Note. Included in this subclass are patents disclosing structure in which one anvil cooperates with substantially one-half of a contoured blade, and the other anvil cooperates with substantially the other half of the contoured blade.
- 513** This subclass is indented under the class definition. Apparatus having at least two tool pairs wherein for one tool of each pair there is an actuating mechanism or member which has a portion thereof in contact with or mechanically connected to that tool or its support and which may be caused to move with respect to that tool to cause motion of the tool with respect to its guide, the arrangement being such that the actuating mechanism for one tool is movable with respect to the actuating mechanism for another.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
598+, for plural tools having the same drive means and an oscillating motion.
618+, for plural tools having the same drive means and a rectilinear motion.
- 514** This subclass is indented under subclass 513. Apparatus wherein one tool of one cutting pair is moved by contact or connection with a relatively movable tool support of one tool of another pair.
- 515** This subclass is indented under subclass 514. Apparatus wherein at least one cutter is a closed aperture forming means and at least one other cutter is a blade or knife.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
667, and 682, for a tool (per se) which performs both a punching and a non-punching operation.
- 516** This subclass is indented under subclass 513. Apparatus wherein the tool supports of one pair of tools are mounted for movement relative to those of a second tool pair so that the distance between the pairs of tools may be adjusted.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
664, for spacers interposed between shaft mounted rotary tools.
- 517** This subclass is indented under subclass 516. Apparatus wherein means are provided, between the members of an adjacent pair of tool supports, to hold up the work piece in cutting position or simultaneously hold it up and guide or clamp it.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
404+, for means to move work between tool stations.
- 518** This subclass is indented under subclass 513. Apparatus wherein at least one cutter is a closed aperture forming means and at least one other cutter is a blade or knife.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
515, for a punch and shear arrangement in which the tool support of one acts as driver for the others and see the Notes thereto.
- 519** This subclass is indented under subclass 513. Apparatus wherein the plurality of tools are so driven that in the cutting stroke one or more of the tools comes into cutting engagement with the work before another one or more tools.
- 520** This subclass is indented under the class definition. Device including means to illuminate or to cast a shadow on a part (or all) of the device or of the work; or means to form a light image of a part (or all) of the device or of the work, whether by reflection or refraction.
- (1) Note. Generally speaking, a patent to the combination of a cutting machine and means for projecting an image of the work to be cut (e.g., a motion picture film) will be placed originally in this or

indented subclass; while a patent to the combination of means to take a picture (as by exposure of photo-sensitive material to light) and a cutting machine will be placed originally in the proper class relating to the s:graphic art involved (e.g., photography).

SEE OR SEARCH CLASS:

33, Geometrical Instruments, subclasses 628+, for a geometrical instrument including a cutting or punching instrumentality and optical viewing means.

521 This subclass is indented under subclass 520. Device in which an image is formed by reflection or refraction.

522.11 WITH SIGNAL, SCALE, OR INDICATOR:

This subclass is indented under the class definition. Device including means to produce a perceptible (e.g., audible or visual) manifestation, of a condition of a part (or all) of the machine, or of a position or characteristic of the work or product.

(1) Note. The means defined above may be calibrated quantitatively.

SEE OR SEARCH THIS CLASS, SUBCLASS:

360+, for a cutting machine controlled by means responsive to the work.
468, for a cutting machine having a claimed work stop abutment provided with a scale or indicator.
520+, for a cutting machine combined with means to illuminate at least part of the machine and/or at least part of the work, or with means to form an optical image of the work.

SEE OR SEARCH CLASS:

33, Geometrical Instruments, subclasses 125+, for a gauge, generally, which may be used in cutting.
116, Signals and Indicators, appropriate subclasses, for a nonelectrical signal or indicator.
340, Communications: Electrical, subclasses 500+, for an electrical automatic condition responsive indicating system, generally.

522.12 Signal; e.g., alarm:

This subclass is indented under subclass 522.11. Device comprising means to produce a dynamic manifestation upon the occurrence of a predetermined desired or undesired condition.

(1) Note. A “dynamic manifestation” is considered to be a discernible change, e.g., a lamp is illuminated, a bell sounds, or a flag swings from one position to another.

522.13 Indicator comprising work or product:

This subclass is indented under subclass 522.11. Device wherein a change is made in the workpiece to display that a condition has been met.

(1) Note. Means to cut an admission ticket to show that adult fare or child fare has been paid is included herein.

522.14 Responsive to force:

This subclass is indented under subclass 522.11. Device wherein a perceptible manifestation is made in reaction to a physical load being applied to the device, or to a portion thereof.

522.15 Indicates tool position:

This subclass is indented under subclass 522.11. Device wherein a perceptible manifestation is made in reaction to the location of an instrumentality intended to effect a cutting action.

522.16 Relative to another element:

This subclass is indented under subclass 522.15. Device wherein a perceptible manifestation is made in reaction to the location of the cutting instrumentality with respect to another member of the device.

522.17 To work-engaging member:

This subclass is indented under subclass 522.16. Device wherein a perceptible manifestation is made in reaction to the location of the cutting instrumentality with respect to a member intended to engage a specific portion of the material to be cut.

522.18 Calibrated scale or indicator:

This subclass is indented under subclass 522.17. Device wherein the perceptible manifestation is digital.

522.19 Indicates dimension of work being cut:

This subclass is indented under subclass 522.18. Device intended to subdivide a portion of the work wherein the perceptible manifestation shows the resultant length of the portion to be subdivided.

522.21 Dynamic indicator:

This subclass is indented under subclass 522.19. Device wherein the means to produce a perceptible manifestation is physically relocated to make such manifestation.

- (1) Note. A repositionable indicator is not necessarily “dynamic”.

522.22 To another tool assembly:

This subclass is indented under subclass 522.16. Device including a grouping of components intended to effect a cutting action and including a second grouping of components intended to effect a second cutting action, wherein a perceptible manifestation is made in reaction to the location of the first cutting grouping with respect to the second grouping.

522.23 To cooperating tool:

This subclass is indented under subclass 522.16. Device including a grouping of components intended to effect a cutting action, wherein the perceptible manifestation is made in reaction to the location of a cutting edge with respect to a second cutting edge reacting therewith.

522.24 To another component of tool assembly:

This subclass is indented under subclass 522.16. Device including a cutting group having a cutting edge on a member movable relative to other portions of the group wherein the perceptible manifestation is made in reaction to the relative position of the cutting edge and another portion.

522.25 Adjustable guide for traversing tool; e.g., radial saw guide or miter saw guide:

This subclass is indented under subclass 522.16. Device with means to provide a transport of a cutting instrumentality and its driving means across a workpiece to effect the cutting action, which means is repositionable with respect the material being cut, wherein the perceptible manifestation is made in reaction to the relative position of the transport means and the material being cut.

522.26 Indicates work characteristic:

This subclass is indented under subclass 522.11. Device wherein the perceptible manifestation is made in reaction to a condition of the material being subjected to a cutting action.

- (1) Note. The material condition of this subclass may comprise a physical position or dimension.

522.27 Indicates wear:

This subclass is indented under subclass 522.11. Device intended to give a manifestation of the gradual deterioration of the device.

522.28 Bubble level:

This subclass is indented under subclass 522.11. Device wherein the means to manifest comprises a member filled with a fluids of distinct specific gravity such that the position of the device with respect to the earth is perceptible by observation of the member.

522.29 Counter:

This subclass is indented under subclass 522.21. Device wherein the means to manifest comprises a member digitally recording the number of actions of the device.

523

This subclass is indented under the class definition. Device including either a tool or tool pair and means to apply a force to either or both tools to effect at least a part of a cutting stroke or cycle or means to constrain a tool for motion in a path defining a cutting stroke or cycle.

SEE OR SEARCH THIS CLASS, SUBCLASS:

651+, for cutting tool claimed, per se, that is, without means to drive or constrain a tool to move in a cutting stroke.

SEE OR SEARCH CLASS:

- 144, Woodworking, subclasses 28.3+, for a pencil-sharpening machine (i.e., one including a cutter and a pointing-facilitating work holder or work guide) including means to drive or guide the cutter.
- 173, Tool Driving or Impacting, appropriate subclass for a means to drive or impact a tool or the like.

- 524** This subclass is indented under subclass 523. Apparatus in which means are effective to disrupt the tool moving means to stop the tool during or after each tool cycle in such manner that the initiation or continuation of a succeeding cutting cycle requires the intervention of a randomly operating agency or stimulus.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 203+, for apparatus of the unicyclic type where the tool engages the work during a dwell in the intermittent feed of the work.
- 484, for a rotatable disc tool carrier movable unicyclically.

SEE OR SEARCH CLASS:

- 173, Tool Driving or Impacting, subclass 19 for a tool driving or impacting means moved through a self acting advance and retraction cycle.
- 234, Selective Cutting (e.g., Punching), subclass 51 for a nonrepeat means in the tool drive of a selective cutting device.

- 525** This subclass is indented under subclass 524. Device, wherein means are provided to vary the position along the cutting path at which the tool is stopped.

- (1) Note. This construction permits stopping the tool closely adjacent the work in its movement toward the work to permit aligning the work and tool in a plane perpendicular to the tool path.

- 526** This subclass is indented under subclass 524. Device wherein tool motion is stopped, with or without interruption of power to the tool, by

imposing frictional or positive retarding force on the tool or its drive train.

- 527** This subclass is indented under subclass 523. Apparatus wherein means is provided for varying the location of one or both of the limits of travel of the tool or a planar tool-moving member (e.g., the presser of a clicker die press) in its cutting or retraction motion.

- (1) Note. Where an adjustable drive has the disclosed purpose of varying the mechanical advantage, such device is classified in subclasses 606 and 634 even though, in changing the mechanical advantage, the datum plane of the tool may also be varied.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 248, for means to change datum plane of tool in apparatus having a tool which engages work during dwell of intermittent work-feed.
- 606, see (1) Note above.
- 634, see (1) Note above.

- 528** This subclass is indented under subclass 527. Apparatus wherein the means to change the datum plane is effective during continued, uninterrupted cyclic operation of the cutter and results in moving the tool support into or out of work engaging range.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 305, for a miscut device for flying a cutter.
- 563+, for apparatus wherein a tool may be displaced to an inactive position (e.g., for work loading).
- 572+, for a device wherein a gag is provided for operatively engaging a cutter member with a continuously actuated driving means.

- 529** This subclass is indented under subclass 527. Apparatus wherein the limit of the tool travel is changed by the use of adjustably positionable obstacles.

- 530** This subclass is indented under subclass 527. Apparatus wherein the limit of the tool travel is varied by changing the length of travel of the tool in its cutting stroke.

- 531** This subclass is indented under subclass 523. Device which comprises a bed (usually horizontal) and an overlying or opposed presser head, one of these being movable toward and away from the other, for the disclosed purpose of applying a force to a free tool (i.e., a tool not secured to either the bed or presser head) which as taught by the disclosure has its cutting edge in contact with the surface of the work, the tool and work (again as disclosed) being disposed between the bed and head to thereby cause the tool to cut the work because of the applied force.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 561+, for a device wherein a tool and a flat surfaced cooperating member are relatively positionable.
 566+, for a device wherein a tool is secured to a moving part and is actuated to carry work in contact therewith through space against a cooperating tool.
 652+, for a tool, per se, of this free tool type.
- 532** This subclass is indented under subclass 531. Apparatus including a carrier or holder for the free tool.
- 533** This subclass is indented under subclass 531. Device wherein the presser head, in the force-applying stroke, has only rectilinear motion toward and from the bed.
- (1) Note. In addition, a lateral swinging or positioning motion of the presser head may be provided, usually to center the presser over the die in various positions of the latter on the work.
- 534** This subclass is indented under subclass 533. Clicker die press wherein the presser head is capable of movement transversely of its rectilinear path so as to permit the head to be located over any desired area of the bed.
- (1) Note. The presser head may also be moved to an inactive position out of registry with the bed, but where the head has only one operative position and may be moved only to an inactive position the patent is placed in subclass 533.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 533+, and see (1) Note.
 561+, for apparatus providing for relative movement between tool and anvil.
 563+, for apparatus wherein a tool may be displaced to an inactive position (e.g., for work bonding).
- 535** This subclass is indented under subclass 534. Device wherein the transverse motion of the presser is limited to swinging about a fixed axis.
- 536** This subclass is indented under subclass 535. Apparatus including power means to swing the presser member laterally over the bed block; or including means to confine the swinging movement of the presser to a desired extent or to otherwise govern such movement.
- 537** This subclass is indented under subclass 536. Apparatus wherein the power applying means, or the limiting or controlling means, is coordinated or synchronized with the means to impart rectilinear movement to the presser head.
- 538** This subclass is indented under subclass 535. Apparatus wherein the presser member is turnably secured to a stationary or nonrotating post.
- (1) Note. The post is usually perpendicular to the bed and may or may not be connected to the head for driving it in rectilinear motion.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 533, for a device wherein the post rotates.
- 539** This subclass is indented under subclass 533. Apparatus including means for positioning or relocating the normally stationary cooperating anvil or work holder.
- (1) Note. "Normally stationary" means that the bed block has no cyclic movement.
- 540** This subclass is indented under subclass 533. Apparatus wherein some provision is made to prevent, allow for, or overcome the bending or tilting of the presser member which is usually of cantilever construction.

- 541** This subclass is indented under subclass 533. Means including a device manipulable by the operator and having motion relative to the head for maneuvering the presser head into operative position over the bed and/or governing reciprocating movement of the head.
- 542** This subclass is indented under subclass 523. Apparatus including means to cause a normally stationary cutter mounted near the work to be deformed to cut the work.
- (1) Note. An example of the apparatus of this subclass might be a roller running along a taut wire, forcing successive portions of the wire through the work.
- (2) Note. This subclass does not include single use cutters such as package or box opening tear strips found in Class 229, Envelopes, Wrappers, and Paperboard Boxes, subclasses 200+.
- SEE OR SEARCH CLASS:
229, Envelopes, Wrappers, and Paperboard Boxes, subclasses 200+, and see (2) Note above.
- 543** This subclass is indented under subclass 523. Device wherein there is interposed in the drive train (between power source and tool) an element which is adapted to break, compress, slip or distort upon occurrence of excessive force.
- (1) Note. The term “yieldable transmission” does not include lost motion or impact means, for which see subclass 616.
- (2) Note. The device of this subclass is to be distinguished from a yieldable power source, such as a driving spring, for which see subclasses 582+.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
582, and see (2) Note above.
616, and see (1) Note above.
- 544** This subclass is indented under subclass 523. Apparatus provided with a protective obstruction to prevent contact of an extraneous object (such as the hand of an operator) with a part of the machine (such as the cutting tool or blade, per se).
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
397+, for guard means which moves in coordination or synchronism with the movement of the tool.
- SEE OR SEARCH CLASS:
74, Machine Element or Mechanism, subclasses 612+ for guards for machine elements.
192, Clutches and Power-Stop Control, subclasses 129+ for stop mechanisms.
474, Endless Belt Power Transmission Systems or Components, subclasses 144+ for a guard or housing for a belt and pulley drive system.
- 545** This subclass is indented under subclass 544. Apparatus wherein the protective obstruction is secured to the machine frame in such a manner that it has no law of motion but serves only as a fixed obstruction.
- 546** This subclass is indented under subclass 545. Apparatus wherein the normally static guard may be repositioned.
- 547** This subclass is indented under subclass 523. Apparatus wherein a length or roll of protective material (such as paper) is so mounted for passage between a tool and its anvil that it is in position during the cutting stroke to prevent direct contact of the tool edge and the anvil.
- 548** This subclass is indented under subclass 523. Apparatus including a plurality of claimed means for actuating the tool support, which means may be used selectively or alternatively at the will of the operator.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
549+, for apparatus having a single drive for selectively driving one of a plurality of tools.
- 549** This subclass is indented under subclass 523. Apparatus wherein a series or group of tools or tool pairs, on one hand, and a common means for transmitting power from a common source to the respective tools or tool supports, on the

other hand, are movable with respect to each other in a noncutting direction so that different tools or tool pairs of the series or group are driven individually by the common transmission as desired.

- (1) Note. The common actuating train need not be immediately preceding or adjacent any of the tools but may be further back in the drive train of any or all thereof, so long as there is a common power train between the tools and the power source with respect to which the tools or tool pairs are relatively movable.
- (2) Note. The unselected tool(s) or tool pair(s) remains inactive in the machine and available for selection.
- (3) Note. For machine having plural cutting tools, each with its own drive train (or with a common drive train), which tools are always available for actuation in any number and in any cycle of machine operation, see Class 234, Selective Cutting (e.g., Punching), and see the class definition of this class (83), section II, Lines With Other Classes, subsection A, Relationship to Other Classes Including, per se, Cutting, Severing, or Incising.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 561+, for a device where a tool may be positioned over different areas of a single flat surfaced cooperating tool.
- 571+, for a device for connecting or disconnecting a tool and its drive.

SEE OR SEARCH CLASS:

- 173, Tool Driving or Impacting, subclasses 50+ for power paths to plural tools from a single drive.
- 234, Selective Cutting (e.g., Punching), (and see (3) Note above).

550 This subclass is indented under subclass 549. Apparatus so constructed that the tools (or tool pairs) must be relatively associated in driving relationship with the common power means in a fixed order of succession.

551 This subclass is indented under subclass 550. Apparatus wherein the tools are tool pairs.

552 This subclass is indented under subclass 549. Apparatus wherein the series or group of spaced tools (or tool pairs) are mounted for bodily simultaneous movement upon a revolvable drum or disk.

SEE OR SEARCH CLASS:

- 29, Metal Working, subclasses 39+ for turret mounted tools for performing plural diverse metal shaping operations.
- 234, Selective Cutting (e.g., Punching), subclasses 99+ and 113, for a turret of interposers (i.e., gag blocks to control the selection of a combination of tools for actuation in a given cycle).
- 483, Tool Changing, subclasses 16+ for a machine tool combined with a significantly recited tool changer. Note that a tool changer of Class 483 bodily removes a tool from the turret.

553 This subclass is indented under subclass 523. Apparatus wherein one or more cutters are positionable to coact, always through the agency of a single drive train, with different ones of a group or series of cooperating cutters.

554 This subclass is indented under subclass 523. Device with means which necessarily results in, or whose disclosed purpose is to permit, successive applications of force, including gravitational, to the tool in its cutting motion (as contrasted with its return motion) in two or more distinct pulses.

SEE OR SEARCH CLASS:

- 234, Selective Cutting, (e.g., Punching), subclasses 76+ for similar tool actuating means in a pattern-controlled card or tape punch.

555 This subclass is indented under subclass 523. Apparatus wherein the tool, in its approach to and contact with the work, follows two or more successive diverse type paths or types of motion; e.g., rectilinear and pivotal.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 376, and 377, for a tool which moves in a vertical path with a clamp, then in a

- second path oblique to the first after the clamp has tightened on the work.
- 644+, for tool motion involving two or more simple components simultaneously present.
- 556** This subclass is indented under subclass 523. Device with means for giving one of the members of a cutting pair a noncutting motion with respect to the work as a result of, or otherwise in timed relation with, either the advancing or retracting portion of the cutting stroke.
- 557** This subclass is indented under subclass 556. Apparatus wherein a cutting anvil is transported, during each cutting cycle, from a retracted noncutting position to an effective position and is again returned to the retracted position.
- 558** This subclass is indented under subclass 556. Apparatus wherein the noncutting motion is along a rectilinear path.
- 559** This subclass is indented under subclass 523. Apparatus wherein both members of a cutting couple are movable (in a noncutting motion) simultaneously to various selected locations with respect to a work holder or to the base or supporting frame of the apparatus.
- 560** This subclass is indented under subclass 559. Apparatus wherein the tool pair is positionable along a rectilinear path.
- 561** This subclass is indented under subclass 523. Apparatus wherein a cutting member performs its cutting operation against a substantially imperforate work holder member and wherein either member may be positioned with respect to the other so as to bring different areas of the work holder into opposed or cutting relationship with the cutting member.
- (1) Note. If the positioning movement is synchronized with the cutting or retraction stroke, the patent would be classified in subclasses 556+.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
531+, for a clicker die press to actuate a loose tool which may be positioned at
- will upon different areas of the work carried by a flat surfaced work holder.
- 556+, and see (1) Note.
- 562** This subclass is indented under subclass 561. Apparatus wherein the members may be relatively positioned along a rectilinear path.
- 563** This subclass is indented under subclass 523. Apparatus with means for moving or permitting movement of a cutting member from an effective cutting position to a retracted or noncutting position, and back to cutting position again.
- (1) Note. The cutting member must remain attached to the apparatus; this subclass does not take patents where the cutting member is detached and laid aside to be again mounted at a subsequent time.
- SEE OR SEARCH CLASS:
483, Tool Changing, subclasses 16+ for a machine tool combined with a significantly recited tool changer. The tool changer of Class 483 is intended to detach and transfer the tool away from the machine tool.
- 564** This subclass is indented under subclass 563. Apparatus wherein the cutting member may be swung or oscillated to and from inactive position.
- 565** This subclass is indented under subclass 523. Device including means to constrain a cutting tool to follow a path, with respect to the work, which is determined (at least in part) by a mutually engaging and relatively movable contoured guide or pattern and a follower associated with the tool positioning means, so that the tool follows a line of cut which is similar (in at least part of its extent) to the guiding surface of the guide or pattern or produces spaced cuts lying along such a similar line.
- (1) Note. Search Class 33, subclasses 18.1+ and 501+ for the guide or pattern and the follower subcombinations.
- SEE OR SEARCH CLASS:
33, Geometrical Instruments, subclasses 18.1+ and 501+, and see (1) Note above.

566 This subclass is indented under subclass 523. Device whose operation, in the manner taught by the disclosure, accomplishes the bodily movement of the work, under the impetus of one tool, through space and into contact with the other or opposing tool of a cutting pair, which other tool is not moving toward or away from the work-moving tool (i.e., not moving in the path of work movement) during the cutting operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

431, for means to press work on to a fixed-type cutter.

531+, for a clicker die press wherein a loose tool; i.e., unattached to a driven tool holder or machine part, may support the work and be moved into contact with the presser head.

567 This subclass is indented under subclass 566. Device including means which acts to grip the work between itself and the tool providing the impetus, during at least part of the work's movement toward the cooperating tool.

(1) Note. Such binding or pressing means may also serve as a product handling instrumentality of the type usually termed "ejector" or "stripper". Patents directed to such means are placed originally in subclasses 111+; a few samples of such patents have been cross-referenced into this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

111+, for a product-handling means which also may serve to bind work to a moving tool; and see (1) Note, above.

382, for a machine in which work is clamped against a tool (or its support); but in which the work is held fixed or immobile during cutting.

568 This subclass is indented under subclass 566. Apparatus including elastic or springlike means (either solid or fluid) supporting one or both tools against the pull of gravity, or urging one or both tools in a particular direction.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

582+, for a device including a tool which is resiliently-supported or biased; the reason for, or mode of, applying the resilient force varying from subclass to subclass.

569 This subclass is indented under subclass 566. Device in which the cooperating or opposed tool is a hollow cutter into the cavity of which the work is forced by the tool providing the impetus; or in which there are a plurality of cooperating or opposed tools into the interstices between which the work is forced by the tool providing the impetus.

570 This subclass is indented under subclass 566. Means in which the motive power, for the tool providing the work-moving impetus, is supplied by the operator or operative.

571 This subclass is indented under subclass 523. Apparatus including means for establishing or disrupting a positive connection between the tool or tool support directly and a power transmitting mechanism.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

58+, for randomly actuated device which brings a tool or other part to a halt at any point in the tool cycle by disrupting the power train thereto.

549+, for apparatus wherein a plurality of tools and a single power transmission means are relatively positionable to selectively drive a single one of the tools.

SEE OR SEARCH CLASS:

234, Selective Cutting (e.g., Punching).

572 This subclass is indented under subclass 571. Apparatus wherein that part of the power transmitting mechanism to or from which the tool is connected or disconnected is in a state of uninterrupted motion.

SEE OR SEARCH CLASS:

234, Selective Cutting (e.g., Punching), appropriate subclasses, particularly subclass 119, for similar tool control in a selective cutting machine.

573 This subclass is indented under subclass 572. Apparatus wherein the force required for connecting or disconnecting the tool is supplied solely by a human operator.

- (1) Note. The operator may act upon the gag through a linkage or other mechanical force modifier which introduces no other source of power. If, however, the claimed subject matter requires that the operator merely actuates a switch or clutch to connect some other source of power with the gag-moving means, the patent is not placed in this subclass, but in subclass 572.

574 This subclass is indented under subclass 523. Apparatus provided with means to change the law of operation of the device, selectively or at will, to require the tool to follow one of a plurality of courses of travel in its cutting stroke; or with means to adapt a cutting implement (a claim to which alone would be proper for Class 30) to operation as a device of this class (83).

575 This subclass is indented under subclass 523. Device wherein the means to move the tool includes an electromechanical transducer in which reciprocatory or oscillatory motion between a coiled conductor carrying electric current and a ferrous or ironlike armature is effected by varying the instantaneous value of current in the conductor.

- (1) Note. The definition of this subclass excludes an electric motor of the usual rotary-shaft type, unless it is so connected in the tool drive that its shaft can only oscillate, without undergoing a full rotation.

SEE OR SEARCH CLASS:

234, Selective Cutting (e.g., Punching), subclass 108, for individually electrically driven tools in a selective cutting machine.

318, Electricity: Motive Power Systems, subclasses 119+, for reciprocating or oscillating motors, generally, and subclass 135, for linear-movement motors, generally.

576 This subclass is indented under subclass 575. Apparatus wherein the tool or its support, in its cutting cycle, actuates a switch or other current-controlling element which is so connected in a circuit that actuation of the switch or element causes a change in the value of current in the coiled conductor.

SEE OR SEARCH THIS CLASS, SUBCLASS:

62+, for stopping means actuated in response to tool- or work-feed means detector.

524+, for unicyclic tool actuation, generally.

577 This subclass is indented under subclass 575. Device wherein the tool or an element rigidly secured thereto also constitutes the armature or movable portion of the electromechanical transducer.

- (1) Note. The coil, rather than the core or armature, may be the tool-actuating element.

578 This subclass is indented under subclass 523. Apparatus wherein the tool comprises two effective edges or blades and may be reciprocated or oscillated so that one edge or blade may cut during movement of the tool in one direction and the other edge or blade may cut during movement of the tool in the other direction.

579 This subclass is indented under subclass 523. Apparatus wherein the tool is guided, cammed, or positioned during at least a portion of the cutting cycle by the opposition or inertia of the work.

- (1) Note. This influence does not include a mere deceleration of the tool upon engagement with the work, but is intended to cover generally any change in direction of tool movement which occurs because of tool engagement with the work.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
378, for tool motion affected by clamping pressure.
- 580** This subclass is indented under subclass 523. Device having a pair of cutting tools, the cutting edge of one tool being a hollow closed figure so arranged that the work to be severed is embraced with a portion of the work protruding axially therefrom, and the cutting edge of the other tool being arranged for relative movement thereof in a plane usually perpendicular to the axis of the hollow tool edge.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
200.1, for a work-enclosing, wire cutting tool, which tool cuts the work by increased tension being applied to the end of the wire.
- 581** This subclass is indented under subclass 523. Device having a work support which holds the work in relation to the surface described by movement of the cutting edge so that the tool cuts the work to provide a surface at an oblique angle to some other surface of the work.
- (1) Note. Included herein are patents for means to cut rods, tubes, and similar elongated work to provide a cut surface at an oblique angle to the longitudinal axis of such work.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
559, for device for positioning a tool pair relative to a workpiece to make a bias cut.
- SEE OR SEARCH CLASS:
144, Woodworking, subclass 28.2, for a pencil-sharpening machine including an elongated work holder or work guide so related to the cutter as to produce a bevelled edge, an elongated piece of attributable marking material.
- 581.1** This subclass is indented under subclass 523. Device wherein the tool is subjected to two balancing forces causing or tending to cause extension of the tool.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
752, for a reciprocable-type tool (e.g., jig-saw) wherein stored energy (e.g., spring means) furnishes drive power in one direction.
- 582** This subclass is indented under subclass 523. Apparatus wherein a tool blade is continuously subjected to a force tending to move it.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
568, for a constantly urged tool that is embodied in a device whose operation is such that, through the impetus of a tool, the workpiece is moved through space into contact with a cooperating tool.
- 583** This subclass is indented under subclass 582. Apparatus wherein the tool blade which is subjected to the force tending to move it is the normally stationary member of a cutting pair.
- 584** This subclass is indented under subclass 582. Apparatus wherein the tool blade upon which the urging force acts is a pivoted blade and the force tends to move the blade along the pivotal axis.
- 585** This subclass is indented under subclass 584. Apparatus wherein the tool blade is also subjected to a force tending to oscillate it.
- 586** This subclass is indented under subclass 582. Apparatus wherein the force tends to move the tool in a cutting stroke and there is provided releasable means to restrain the tool against moving.
- 587** This subclass is indented under subclass 586. Apparatus wherein an additional means (other than the restraining means) is provided for returning the tool to its restrained retracted position.
- 588** This subclass is indented under subclass 582. Apparatus wherein the tool blade is constantly subjected to a force tending to move it in the direction away from the work or a cooperating cutter member.

- 589** This subclass is indented under subclass 588. Apparatus wherein the tool subjected to the force tending to move it is a pivoted blade.
- 590** This subclass is indented under subclass 523. Device in which means other than that which drives the cutter into the work is provided specifically for the purpose of withdrawing the cutter from the work.
- 591** This subclass is indented under subclass 523. Apparatus wherein a tool is mounted for movement in one direction only about a fixed axis, the cutting blade being arranged thereon so that it will cyclically approach and recede from work presented thereto.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 469+, for rotatable disc cutter and carrier therefor, and especially subclasses 491+ for means to rotate or oscillate such a cutter.
- 592** This subclass is indented under subclass 591. Device whose cutting blade derives substantially all its support (either directly or indirectly) from its attachment to the external surface substantially normal to the axis of a rotating disk or disklike member.
- 593** This subclass is indented under subclass 591. Device provided with means to change the speed of revolution of the tool during each revolution.
- (1) Note. The speed change may involve, for instance, an acceleration of the tool in the cutting zone and deceleration elsewhere; or, by way of further example, the stopping and restarting of the tool at least once during each revolution.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 69, for a cutting machine having means to stop at least part of the machine after a predetermined number of tool cycles.
 298, 313, 311+, for a "flying" cutting machine having means to vary the speed of a cutting tool.
- 617, for a machine of the simple rectilinear type having means to vary the speed of a cutting tool.
- 594** This subclass is indented under subclass 591. Means in which the moving tool passes through a cut-away or a re-entrant portion in a cooperating tool while making contact with a cutting edge of such other tool to effect a cut, or passes through the gap produced by spaced portions of a work-holding means and effects a cut while so passing.
- 595** This subclass is indented under subclass 594. Apparatus in which the moving tool and its cooperating tool are so related to each other, or in which the moving tool working through a recess in a work holder is so shaped or configured, that the work is cut with a continuing or slicing action, rather than substantially simultaneously, as the locus of cutting contact with the work shifts along the tool edge(s).
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 596, for other progressively cutting rotary cutters.
 611, for a progressively cutting oscillating cutter of the axially extending cutting-edge type.
 636, for a progressively cutting rectilinear reciprocating cutter.
- 596** This subclass is indented under subclass 591. Apparatus wherein the cutting blade is so formed that the work is cut with a continuing or slicing action such that the locus of cutting contact with the work shifts along the blade edge.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 595, for other progressively cutting rotary cutters.
 611, for progressively cutting oscillating cutters of the axially extending cutting edge type.
 636, for progressively cutting rectilinear reciprocating cutters.
- 597** This subclass is indented under subclass 523. Apparatus wherein a tool is rotatably reciprocated about a fixed axis toward and away from

work support by a work holder or ledger blade to cut and then retract.

- (1) Note. For patents wherein the cutting member moves continuously in one direction about a fixed axis see subclasses 591+.

598 This subclass is indented under subclass 597. Apparatus wherein there is more than one set of cooperating cutting pairs.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

513+, for plural cutters each having a separate driving mechanism one of which moves relative to another.

599 This subclass is indented under subclass 598. Apparatus wherein a single pivoted member carries more than one tool.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

620+, for a device having plural tools carried by a single rectilinearly reciprocating support.

600 This subclass is indented under subclass 597. Apparatus wherein both members of a cutting pair are moved in the cutting stroke.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

623, for a rectilinearly reciprocating device wherein both members of the cutting pair are moved in a cutting stroke.

601 This subclass is indented under subclass 597. Apparatus wherein the actuating means for the oscillating tool or tool holder comprises a member which has a different path of motion than that of the tool or tool holder.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

627+, for tool driver movable relative to rectilinearly reciprocating tool support.

602 This subclass is indented under subclass 601. Apparatus wherein the member which actuates the tool or tool holder oscillates or rotates about a center and carries a surface of fixed points of varying distance from the center,

which surface imparts motion to a follower in contact therewith which motion varies in accordance with the varying distances of the fixed points on the surface from the center of the member.

- (1) Note. The follower may be the tool or tool support.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

628, for cam or eccentric driver for rectilinearly reciprocating cutter.

603 This subclass is indented under subclass 601. Apparatus wherein the member which actuates the tool or tool holder is provided with one or more protuberances or grooves which interengage and cooperate with mating protuberances on, or grooves in, the tool holder to form therewith a positive force transmitting means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

629, for gear driver for rectilinearly reciprocating cutter.

604 This subclass is indented under subclass 601. Apparatus wherein the tool or tool holder is actuated by two bars pivotally joined together at their ends, the other end of one bar being pivotally attached to the tool holder and the other end of the second bar being pivotally mounted to an element which is fixed with respect to the path of the tool holder motion, the bars being so oriented that movement of the bars so as to put the centers of the three pivots in line will actuate the tool or tool holder in a cutting stroke.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

630, for a toggle link driver for a rectilinearly reciprocating cutter.

SEE OR SEARCH CLASS:

81, Tools, subclasses 367+ for a toggle-link actuator means for a plier-type tool.

605 This subclass is indented under subclass 601. Apparatus wherein the tool or tool holder is actuated by one or more members at least one of which oscillates about a center, which center

is always in a fixed position with respect to the axis of the tool or tool holder.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

633, for fixed axis lever drive for rectilinearly reciprocating cutter.

- 606** This subclass is indented under subclass 605. Apparatus having two or more actuating levers wherein the point of connection between two or more levers may be varied.

(1) Note. For line between this subclass and subclass 527 see (1) Note under subclass 527.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

634, for adjustable drive for varying the mechanical advantage for rectilinearly reciprocating cutter.

- 607** This subclass is indented under subclass 597. Apparatus wherein the cutting edge is so disposed that in its cutting motion it generates a surface perpendicular to the fixed axis.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

592, for radially mounted revolving tool.

- 608** This subclass is indented under subclass 607. Apparatus wherein the moving tool support on the one hand, or the work holder or ledger blade on the other hand, may be positioned as desired relative to each other.

(1) Note. Patents for devices wherein the adjustment of the tool blade results in the changing of the datum plane of the tool stroke are placed in subclasses 527+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

527+, and see (1) Note above.

- 609** This subclass is indented under subclass 607. Apparatus wherein a means additional to an axial bearing or guide structure is provided to engage the movable cutting blade and maintain it in its proper cutting path.

- 610** This subclass is indented under subclass 597. Apparatus wherein the cutting edge is so disposed that in the cutting motion it generates a right cylinder or segment thereof.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

591+, for a cutting blade moving continuously in one direction about a fixed axis.

- 611** This subclass is indented under subclass 610. Apparatus wherein the cutting edge is so shaped that it coacts with the work holder or ledger blade so that the point or area of severance of the work advances along the axis of the tool.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

596, for progressively cutting rotary cutter.
636, for progressively cutting rectilinear reciprocating cutter.

- 612** This subclass is indented under subclass 610. Apparatus wherein either the moving tool support or the ledger blade or work holder maybe positioned as desired.

(1) Note. Patents for devices wherein the adjustment of the tool blade results in the changing of the datum plane in the tool stroke are placed in subclasses 527+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

527+, and see (1) Note above.

- 613** This subclass is indented under subclass 523. Apparatus wherein a tool or tool holder is moved in alternate directions in a straight line, for example, toward and away from a co-operating ledger blade or work holder to cut and to retract from the work placed therebetween.

- 614** This subclass is indented under subclass 613. Apparatus wherein the movable tool engages the entire thickness of a flat workpiece and moves in a direction to traverse the workpiece from one side boundary thereof to another.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 455, for a traveling cutter whose guide serves as a clamp for work.
- 469+, for a traveling cutter of the rotary disc type, and especially subclasses 485+ for reciprocable tool carrier.

615 This subclass is indented under subclass 613. Apparatus wherein counter-balancing means is provided to negate or neutralize the kinetic effect of the weight of the punching mechanism.

616 This subclass is indented under subclass 613. Devices wherein a driving element moves idly through a portion of its travel before contacting another element which transmits motion to the cutter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 531+, for a tool of the clicker die type.

617 This subclass is indented under subclass 613. Apparatus wherein means are provided to accelerate or decelerate the tool and/or change the impetus of the actuating means on the tool during a stroke.

- (1) Note. To be placed in this subclass, a patent must have the disclosed purpose of changing the force or speed of the tool. Those devices having mechanical drives which would inherently change the force or speed of a tool in its stroke, but which are silent as to such change of force or speed, are placed in the respective structural subclasses. See subclasses 624+ and 627+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 624+, and see (1) Note above.
- 627+, and see (1) Note above.
- 628, for cam or eccentric actuator.

618 This subclass is indented under subclass 613. Apparatus wherein there is more than one cutting tool, each of which is driven by the same power transmission means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 513+, for plural cutters each having a separate driving mechanism one of which moves relative to another.
- 598+, for plural cutters of the oscillating type.

619 This subclass is indented under subclass 618. Device including two or more tools located in position by means of a plate element provided with holes or other means which are engageable with dowels or the like as associated with the tools or their holders, so that a number of tools may be readily brought into a predetermined relationship.

- (1) Note. The template may or may not serve as a structural part of the machine framing, but it should remain in place as a machine element as distinguished from a setting-up appliance.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 565, for a template which controls the path of movement of a tool in its cutting stroke.

620 This subclass is indented under subclass 618. Apparatus wherein there is more than one tool on one of the tool supports.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 599, for plural tools on a single oscillating arm or tool holder.

621 This subclass is indented under subclass 620. Apparatus wherein the plural tools are telescopically arranged one within another (e.g., nut and washer cutting and punching machines).

622 This subclass is indented under subclass 620. Apparatus wherein the plurality of tools are so arranged on the tool support that in the cutting stroke one of the tools comes into cutting engagement with the work ahead of another.

623 This subclass is indented under subclass 613. Apparatus wherein during the cutting cycle, both the tool or tool holder, on the one hand,

and the cooperating ledger blade or work holder, on the other hand, are given simple rectilinear motion.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

600, for a device wherein both members of a cutting pair have motion in a cutting stroke, at least one of which is an oscillating motion.

624 This subclass is indented under subclass 613. Apparatus wherein alternate-motion-creating force is applied to both extremities of an elongated tool carrying member which is restrained by guides at each extremity to travel in a rectilinear path, the extremities being located in the areas closest to the respective cross-head guides.

625 This subclass is indented under subclass 624. Apparatus wherein the force is applied by means of pivoted oscillating arms which have different paths of motion than that of the tool or tool support, and which are pivoted on centers which are always in a fixed position with respect to the path of the tool or tool support.

626 This subclass is indented under subclass 624. Apparatus wherein the means for applying force to the extremities of the tool carrying member is a lever having a bearing at each end, one bearing connecting the lever to the extremity of the tool carrying member, for transmitting motion to the extremity by a push and pull movement, the other bearing being connected to some force transmitting mechanism.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

632, for single connecting rod articulated with tool support.

627 This subclass is indented under subclass 613. Apparatus wherein the actuating means for the reciprocating tool or tool holder comprises a member which has a different path of motion than that of the tool or tool holder.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

601+, for tool drivers movable relative to oscillating tool supports.

628 This subclass is indented under subclass 627. Apparatus wherein the member which actuates the tool or tool holder oscillates or rotates about a center and carries a surface of fixed points of varying distance from the center which surface imparts motion to a follower in contact therewith which motion varies in accordance with the varying distances of the fixed points on the surface from the center of the member.

(1) Note. The follower maybe the tool or tool support.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

602, for cam or eccentric drivers for oscillating tool supports.

629 This subclass is indented under subclass 627. Apparatus wherein the member which actuates the tool or tool holder is provided with one or more protuberances or grooves which interengage and cooperate with mating protuberances on, or grooves in, the tool holder to form therewith a positive force transmitting means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

603, for gear drivers for oscillating tools.

630 This subclass is indented under subclass 627. Apparatus wherein the tool or tool holder is actuated by two bars pivotally joined together at their ends, the other end of one bar being pivotally attached to the tool holder and the other end of the second bar being pivotally mounted to an element which is fixed with respect to the path of the tool holder motion, the bars being so oriented that movement of the bars so as to put the centers of the three pivots in line will actuate the tool or tool holder in a cutting stroke.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

604, for a toggle link driver for an oscillating tool.

SEE OR SEARCH CLASS:

81, Tools, subclasses 367+ for toggle-link actuator means for plier-type tool.

631 This subclass is indented under subclass 627. Apparatus wherein the tool or tool holder is either internally or externally threaded and is driven by a mating threaded driver.

632 This subclass is indented under subclass 627. Apparatus wherein the actuating means for the tool or tool holder is an intermediate connector having a bearing at each end, one bearing connecting it to the tool or tool holder, for transmitting motion to the tool by a push and pull movement, the other bearing being connected to some force transmitting mechanism.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

626, for connecting rod articulated to opposite ends of a tool-supporting cross-head.

633 This subclass is indented under subclass 627. Apparatus wherein the tool or tool holder actuating member oscillates about a center, which center is always in a fixed position with respect to any point on the straight line path of tool movement.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

605+, for fixed axis lever driver for an oscillating tool.

634 This subclass is indented under subclass 633. Apparatus wherein the point of connection between two or more of the actuating levers may be varied.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

527+, for means to change the datum plane of a tool or tool-presser stroke and see (1) Note thereunder for the line.

606, for adjustable driver for varying the mechanical advantage for an oscillating cutter.

635 This subclass is indented under subclass 627. Apparatus wherein a passive means is provided to engage with and thereby direct the course of movement of, a moving cutting member or cutting member holder.

636 This subclass is indented under subclass 613. Apparatus wherein the direction of motion of the cutting member is in a plane normal to the broad side of the work and the member is so shaped that it coacts with the ledger blade or work holder so as to shear the work in a gradually advancing manner.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

595, and 596, for progressively cutting rotary cutters.

611, for progressively cutting oscillating cutters of the axially extending cutting edge type.

637 This subclass is indented under subclass 613. Apparatus wherein two or more guide members are provided to align a punch and die.

SEE OR SEARCH CLASS:

384, Bearings, subclasses 7+ for linear bearings.

638 This subclass is indented under subclass 613. Rectilinearly reciprocating tool which is guided by slots, ways, etc., which are disposed at an oblique angle to ledger blade or work holder in the plane of movement of the tool.

(1) Note. The inclination of the tool guide-means generally serves to impart a slicing or draw-cutting action to the tool, as distinguished from the bevel-cutting referred to in subclass 581.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

581, for a tool which is guided in a plane oblique to the work table for bevel-cutting.

639.1 Fluid pressure actuated:

This subclass is indented under subclass 613. Apparatus wherein the cutting blade is caused to move in a cutting stroke by an expansible chamber motor.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

177, for apparatus wherein the cutting tool itself is a fluid blast or suction, that cooperates with a fixed reaction tool

or with a directly opposing second fluid blast.

639.2 Utilizing fluid amplifier:

This subclass is indented under subclass 639.1. Apparatus wherein the cutting blade is caused to move in a cutting stroke by an expansible chamber motor that utilizes the inertia of moving fluid impinging upon a portion thereof as a source of pressure.

639.3 Diaphragm:

This subclass is indented under subclass 639.1. Apparatus wherein the cutting blade is caused to move in a cutting stroke by an expansible chamber motor having a flexible portion that moves to carry the cutting blade.

639.4 Explosive fluid:

This subclass is indented under subclass 639.1. Apparatus wherein the cutting blade is caused to move in a cutting stroke by an expansible chamber motor by the action of fluid therein, that has been caused to burn and thereby expand and drive the movable portion of the motor to carry the blade.

639.5 Plural cylinders:

This subclass is indented under subclass 639.1. Apparatus wherein the cutting blade(s) is caused to move by more than one expansible chamber motor.

- (1) Note. A single blade driven by plural cylinders is included herein, as is a device including a blade driven by a first cylinder and a second blade driven by a second cylinder.

639.7 Offset cutter:

This subclass is indented under subclass 639.1. Apparatus wherein the force of the expansible chamber device extends along a first line and wherein the resultant force on the cutting tool extends along a second, distinct line.

640 This subclass is indented under subclass 613. Apparatus wherein a tool may be positioned with respect to its tool holder.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

527+, for a device wherein the means to vary the position of the tool on its

holder serves to vary the limits of travel of the tool.

556+, for a device wherein the tool is positioned in synchronization with the cutting stroke.

560, for a device wherein a tool pair is positioned as a unit.

561+, for a device wherein a tool and a flat surfaced cooperating member are relatively positionable.

641 This subclass is indented under subclass 640. Apparatus wherein means are provided for positioning the ledger blade or work holder.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

583, for a spring-biased ledger blade.

642 This subclass is indented under subclass 523. Means whose tool motion is a nonlinear combination of work-approaching and lateral components of motion in a plane, during which motion the tool remains parallel to its initial position throughout its stroke.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

638, for a rectilinearly moving tool operating in inclined guides and which may effect a draw-cut.

643 This subclass is indented under subclass 642. Device in which the tool is suspended, guided and/or restrained in its motion by a plurality of parallel links of equal length.

- (1) Note. The links may, of course, comprise portions of levers, bell-cranks, or other elements having additional functions.

644 This subclass is indented under subclass 523. Device whose cutter has a component of rotation of less than 360° about a pivot, which pivot reciprocates rectilinearly.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

647.5, for a similar device wherein the pivot moves in a circular path.

646 This subclass is indented under subclass 523. Apparatus wherein a plurality of motions are given to the cutting member simultaneously, all of the motions being in the same plane.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

644+, for rectilinear motion combined with rotary tilting motion.

647 This subclass is indented under subclass 646. Apparatus wherein one of the motions is a to-and-fro motion while another motion is toward the work, thus giving the tool a sawing type action.

647.5 This subclass is indented under subclass 646. Device whose cutter has a component of rotation about a pivot, which pivot moves about a fixed center.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

644+, for a similar device wherein the pivot moves in a straight line.

648 This subclass is indented under the class definition. Device including a tool and means to support the work during cutting or to support a reserve stock of the work.

(1) Note. For the distinctions between this subclass and Class 269 and subclasses 523+ and 651+ of this class, see (3) Note under subclasses 651+ of this class.

SEE OR SEARCH CLASS:

144, Woodworking, subclasses 28.1+, for a pencil-sharpening machine; i.e., including movably related cutter and pointing-facilitating work-holder parts.

225, Severing by Tearing or Breaking, appropriate subclasses, for similar work supply means combined with a tool of the type classified in that class.

269, Work Holders, appropriate subclasses for a work holder, per se, or a work holder with a tool couple element, and see (1) Note above.

649 This subclass is indented under subclass 648. Device in which the work supply is in the form of a web or strand wrapped upon itself and the supply is supported for rotation upon an axis.

(1) Note. This subclass is the locus of all patents including a cutting tool and means to support a reserve supply of work in which the work supply is in the form of a web or strand wrapped upon itself and the supply is supported for rotation upon an axis. Hence, the usual lines between this class (83) and Class 30, Cutlery, do not apply in this situation (see section II, Lines With Other Classes, subsection A, Relationship to Other Classes Including, per se, Cutting, Severing, or Incising, paragraph 1, The class of cutting implements, Class 30). Class 225, Severing by Tearing or Breaking, includes patents reciting a tearing edge or a breaking device and means to support a reserve supply of work.

650 This subclass is indented under subclass 649. Device in which two or more work supplies are associated with the tool so as to permit selective severing from one or more of the supplies.

651 This subclass is indented under the class definition. Device comprising a tool, or a tool and its support, or a plurality of tools with a common support, ("tool" and "tool support" being defined in the Glossary).

(1) Note. A patent drawn to a tool having a portion specifically provided for in a subclass higher in this schedule will be found in such subclass. For example, a patent claiming a tool having a portion which has the specific purpose of guiding the product will be found in subclasses 78+. As another example, a patent drawn to a tool having a portion thereon whose purpose is to act as a work-stop abutment will be found in subclasses 391+ or subclasses 467+.

(2) Note. This and indented subclasses include a tool pair as defined in the Glossary if the means for moving, guiding or permitting movement of either of the

tools in the pair is not claimed. However, this subclass does not include a tool pair of the type provided for in subclasses 284+ (particularly subclasses 343+), subclasses 469+ or subclasses 509+.

- (3) Note. For distinction between a tool for this and indented subclasses and a work holder or work support for Class 269, see section II, Lines With Other Classes, subsection, Work Holder in Combination With Treating Means, paragraph B, 1, under the Class Definition of Class 269. A patent disclosing a work holder or work support of the type classified in Class 269 and a tool movable with respect to the work support or work holder to effect cutting, will be found in subclasses 648+ of this class if the tool is claimed in combination with the work holder or work support, but no means to move or permit movement of the tool is claimed. (The inclusion of such named means will result in the placement of the patent in subclasses 523+, above).
- (4) Note. This and indented subclasses provide for patents claiming a joint or connection between a tool and a tool support. However, where the claimed joint or connection is specifically provided for in an existing body of art and only that portion of the tool is claimed which is necessary to modify the joint or connection, the patent will be found in such body of art. Such bodies of art include, Class 279, Class 285, Class 403.
- (5) Note. A tool defined in terms of its composition without the claiming of significant structure enabling the composition to operate as a tool is placed originally in the class providing for the composition, rather than in this class.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

284+, and see (2) Note, above.
 469+, and see (2) Note, above.
 509+, and see (2) Note, above.
 523+, and see (3) Note, above.
 648+, and see (3) Note, above.

SEE OR SEARCH CLASS:

269, Work Holders, appropriate subclasses and see (3) Note, above.
 279, Chucks or Sockets, appropriate subclasses and see (4) Note, above.
 285, Pipe Joints or Couplings, appropriate subclasses and see (4) Note, above.
 403, Joints and Connections, appropriate subclasses and see (4) Note, above.
 407, Cutters, for Shaping, for a cutter intended to give shape other than subdividing the work; e.g., the cutter to be used in a milling machine or the cutter to be used in a lathe.

- 651.1** This subclass is indented under subclass 651. Device wherein the tool comprises at least one wire (elongated member having a diameter which is relatively insignificant compared to its length).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

200.1, for a wire-tool type cutting device which functions by having an increased tensional stress applied to said tool after it is placed in position to encircle or surround at least a portion of the work.
 307.1+, for a "flying" wire cutting tool.

- 652** This subclass is indented under subclass 651. Device which is disclosed as being supported against gravity solely by resting on the work, and which is caused to cut the work by being forced into the work by a force applying member that is not connected thereto.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

531+, for a clicker die press utilizing a work supported tool.

SEE OR SEARCH CLASS:

30, Cutlery, subclasses 314+ for a work supported cutting implement.

- 653** This subclass is indented under subclass 652. Device having a special provided portion which enables (that is, permits) another element to remove the product from the tool.

- (1) Note. The facilitator may be simply a channel for an operator's finger.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
78+, for a tool having means for moving or guiding the product.
- SEE OR SEARCH CLASS:
269, Work Holders, subclass 13 for a product discharge facilitator on a work holder.
- 654** This subclass is indented under subclass 652. Device provided with a special part or element which is intended to be grasped to facilitate placing the tool on or removing it from the work.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
532, for a clicker die press with a die handling attachment.
- 655** This subclass is indented under subclass 652. Device having a portion thereon whose function is to engage a particular portion of the work so as to enable the tool to be placed on top of a desired part of the work.
- 656** This subclass is indented under subclass 652. Device which, in its intended use, cuts out a discrete product from the work and in addition makes a cut within the confines of the product that does not intersect any edge of the product.
- 657** This subclass is indented under subclass 652. Device having means to change, or permit the changing of, the relative positions of two work contacting cutting portions, of the tool to thereby change the size and/or shape to the cut made in the work by the tool.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
696, for a tool having tool contour adjusting means.
- 658** This subclass is indented under subclass 651. Device wherein the tool is an anvil as defined in the Glossary.
- SEE OR SEARCH CLASS:
269, Work Holders, subclasses 289+ and section V(B) 2 of the class definition (269) for the line.
- 659** This subclass is indented under subclass 658. Device wherein the anvil, during the cutting operation, swings in a single direction about an axis that is fixed with respect to the anvil.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
663+, for a rotatable type tool that is not an anvil.
- 660** This subclass is indented under subclass 651. Device wherein the portion of the tool contacting the work has a pointed end which, in operation, penetrates the work and, without removing any material from the work, makes a hole having substantially the same dimension as the dimension of the portion of the tool that penetrates the work.
- 661** This subclass is indented under subclass 651. Device wherein the tool in use forms a closed loop of flexible material wrapped about or traveling about a plurality of pulleys or drums.
- 662** This subclass is indented under subclass 651. Device wherein the tool has an elongated cutting edge and is connected at or near each of the ends of its cutting edge to a tool support, with the tool being unsecured to the support for at least a portion of its length between said connections.
- (1) Note. The tool may have an additional backing member bearing against it between the connections to the spaced arms.
- 663** This subclass is indented under subclass 651. Means which is intended (during cutting) to swing in a single direction about an axis that is fixed with respect to the tool.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
343+, for a rotatable tool pair of the flying pair.
469+, for a rotatable disc tool pair or tool and carrier, especially subclasses

- 495+, for a rotatable tool combined with means to cause or permit such rotation.
- 591+, for a means to cause or permit simple revolving motion of a tool.
- 659, for a rotatable type anvil.
- 698.41+, for a rotary cutter joint or connection, or for a nominally recited rotary cutter in combination with a joint or connection therefor.
- 664** This subclass is indented under subclass 663. Device wherein a plurality of tools are mounted on an elongated rotatable member extending through the centers of the tools or tool supports, so that the tools rotate with such member; with at least two tools being axially spaced along the elongated member by means of an element positioned between facing sides of such two tools or their supports.
- 665** This subclass is indented under subclass 663. Device including a tool or tool support fixedly secured to and circumferentially encompassing an elongated member having a length substantially greater than the dimension of the tool or tool support along the axis of the member; and means for securing the member to the tool or tool support.
- (1) Note. For the placement of a patent as an original in this subclass, the securing means must be claimed.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
698.11+, for a connection between a tool and a tool support.
- SEE OR SEARCH CLASS:
403, Joints and Connections, appropriate subclasses, for means for securing a collar or like member to a shaft and see (4) Note under subclass 651 of this class for the line.
- 666** This subclass is indented under subclass 665. Device wherein the tool or tool support is secured to the shaft at or near one extremity thereof.
- 667** This subclass is indented under subclass 663. Device which is constructed to perform a punching operation on the work as defined in the Definition or Terms and also make a cut in the work which is not a punching cut.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
682, for another punching plus nonpunching tool.
- 668** This subclass is indented under subclass 663. Device which is constructed to perform a notching operation on the work as defined in the Glossary and also make a cut in the work which is not a notching cut.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
683, for another notching plus nonnotching tool.
- 669** This subclass is indented under subclass 663. Device which is constructed to perform a punching operation on the work as defined in the Glossary.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
684+, for another punching tool.
- 670** This subclass is indented under subclass 669. Device which is constructed to cut the work by a shearing operation as defined in the Glossary.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
686+, and 690, for another shearing type tool.
- 671** This subclass is indented under subclass 663. Device which is constructed to perform a notching operation on the work as defined in the Glossary.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
692+, for another notching tool.
- 672** This subclass is indented under subclass 663. Device wherein at least a portion of the work-contacting (cutting) part of the tool follows the mathematical space curve commonly known as a helix.

- 673** This subclass is indented under subclass 663. Device which is constructed to make a shearing cut as defined in the Glossary.
- 674** This subclass is indented under subclass 673. Device wherein all of the work-contacting (cutting) portion of the tool lies along a straight line, all points of which are equidistant from the axis of rotation.
- 675** This subclass is indented under subclass 673. Device wherein all of the work-contacting (cutting) portion of the tool lies in a plane that is at a right angle with respect to the axis of rotation of the tool.
- 676** This subclass is indented under subclass 663. Device which consists of a relatively thin, generally flat, member having work-contacting (cutting) portion or portions along its periphery, such portion or portions being symmetrically arranged with respect to the geometric center.
- (1) Note. Included in this subclass are a disc-type tool having a circular periphery, a tool having a serrated or saw toothed periphery, and a tool having a plurality of equiangularly spaced cutting lobes.
- 677** This subclass is indented under subclass 663. Device wherein the work-contacting (cutting) portion of the tool is spaced from the axis of rotation and the tool is so mounted on the tool support that the distance from said portion of the tool to the axis of rotation may be varied.
- 678** This subclass is indented under subclass 663. Means wherein the device is comprised of a plurality of cutting elements, each adapted to make a separate cut in the work, with the cuts being unconnected to each other, so that the resultant product has an uncut portion between cut portions.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
695, for another spaced cut forming tool.
- 679** This subclass is indented under subclass 651. Means wherein the device is intended to be initially on one side of the work and to cause the work to be cut by the relative movement of such device with respect to another tool located on the opposite side of the work.
- 680** This subclass is indented under subclass 679. Device constructed to make a cut in the shape of a series of convolutions of ever increasing radius.
- 681** This subclass is indented under subclass 679. Device constructed to perform a punching operation as defined in the Glossary and to make a cut in the punched-out portion produced by the punching operation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
656, for a work supported tool that cuts out an article and cuts within the article.
682, for a tool that makes both a punching and nonpunching cut, the nonpunching cut not being within the punched out article.
- 682** This subclass is indented under subclass 679. Device constructed to perform a punching operation as defined in the Glossary and also to make a cut in the work which is not a punching cut.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
667, for a punching plus nonpunching tool of the rotatable type.
681, for a punching tool which also makes a cut within the punched out article.
- 683** This subclass is indented under subclass 679. Device constructed to perform a notching operation as defined in the Glossary and also to make a cut in the work which is not a notching cut.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
668, for a notching plus nonnotching tool of the rotatable type.
- 684** This subclass is indented under subclass 679. Device constructed to perform a punching operation as defined in the Glossary.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
669+, for a punching tool of the rotatable type.
- 685** This subclass is indented under subclass 684. Device which, as claimed, includes both tools of the tool pair as defined in the Glossary.
- 686** This subclass is indented under subclass 684. Device whose claimed tool is constructed to cut the work by a shearing operation, as defined in the Glossary, by penetrating a complementary female tool.
- 687** This subclass is indented under subclass 686. Means wherein the device comprises a plurality of cutting elements mounted on a common support, each of the elements being intended to cut out a discrete product unconnected with a product cut-out by another element.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
691, for another punching tool that produces multiple punchings.
- 688** This subclass is indented under subclass 686. Device, wherein the tool has at least two portions thereon effective to cut the work by a shearing action, as defined in the Glossary, said portions being connected by a portion of the tool which is not effective to cut the work, one of said work cutting portions engaging the work before the other portion.
- SEE OR SEARCH CLASS:
407, Cutters, for Shaping, subclasses 13+ for a broaching tool having a series of teeth that successively cut to enlarge an existing hole.
- 689** This subclass is indented under subclass 686. Device wherein the cutting edge of the male tool that coacts with the female tool to effect cutting is so constructed that in its intended operation the work will initially be engaged by a portion only of the edge, with other edge portions then successively engaging the work until the punching operation is completed.
- 690** This subclass is indented under subclass 684. Device whose claimed tool is constructed to cut the work by a shearing operation, as defined in the Glossary, by being penetrated by a complementary male tool.
- 691** This subclass is indented under subclass 684. Means wherein the device comprises a plurality of cutting elements mounted on a common support, each of the elements being intended to cut out a discrete product unconnected with a product cut out by another element.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
687, for a shear-type male punching tool that produces multiple punchings.
- 692** This subclass is indented under subclass 679. Device constructed to perform a notching operation, as defined in the Glossary.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
671, for a notching tool of the rotatable type.
- 693** This subclass is indented under subclass 692. Device constructed to cut the work by a shearing operation, as defined in the Glossary.
- 694** This subclass is indented under subclass 679. Device constructed to cut the work by a shearing operation as defined in Glossary.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
670, and 673+, for a shearing tool of the rotatable type.
686+, and 690, for a shear-type punching tool.
693, for a shear-type notching tool.
- 695** This subclass is indented under subclass 679. Means wherein the device comprises a plurality of cutting elements each adapted to make a separate cut in the work, with the cuts being unconnected to each other, so that the resultant product has an uncut portion between cut portions.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

678, for a spaced cut forming tool of the rotatable type.

- 696** This subclass is indented under subclass 679. Device having means to change, or permit the changing of, the relative positions of two work contacting cutting portions of the tool to thereby change the size and/or shape of the cut made in the work by the tool.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

657, for a work supported tool having tool contour adjusting means.

- 697** This subclass is indented under subclass 651. Means which is intended in operation to be moved toward and away from the work along the same path so as to effect cutting during this movement.

(1) Note. A tool that oscillates in operation or moves to-and-fro in a sinuous path is considered to be of the reciprocable type.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

679+, for a reciprocable tool of the cutting couple type.

698.71+, for a reciprocable cutter joint or connection, or for a nominally recited reciprocable cutter in combination with a joint or connection therefor.

698.11 Joint or connection:

This subclass is indented under subclass 651. Device wherein means are provided for (a) securing a cutting tool to its support, (b) securing one cutting element of a tool to another cutting element, or (c) securing one portion of a cutting tool support to another portion of a tool support.

(1) Note. Included herein are patents to connections for strippers and guide assemblies for moving tools and tool supports.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

129, through 146, for a stripper to which a joint or connection of this subclass pertains.

651, see the (4) Note for the line with existing classes providing for joints and connections.

698.21 Magnetic connection:

This subclass is indented under subclass 698.11. Joint or connection including means to secure a tool or tool support in position by utilizing the force of a magnet to a ferromagnetic member.

698.31 Resiliently biased connection:

This subclass is indented under subclass 698.11. Joint or connection including means to secure a tool or tool support in position by utilizing the force of a component thereof stressed within its elastic limit.

698.41 For rotary tool:

This subclass is indented under subclass 698.11. Joint or connection wherein the tool is one carried to turn at least 360 degrees about an axis passing therethrough comprising means for (a) securing that tool to its support or (b) for securing that tool to another tool.

(1) Note. This subclass does not include securing one portion of a tool support to another portion of a tool support.

698.42 Flexible sleeve-like tool:

This subclass is indented under subclass 698.41. Joint or connection wherein the tool comprises a pliable cylindrical collar substantially encompassing a generally cylindrical roller.

698.51 Adjustable:

This subclass is indented under subclass 698.41. Joint or connection wherein means are provided which enable the cutting element of the tool to be positioned on its support, or in the case of a tool having multiple cutting elements, to be positioned relative to another cutting element.

SEE OR SEARCH THIS CLASS, SUBCLASS:

699.51, and see the search notes thereunder for other adjustable joints or connections under the class definition.

698.61 Rectilinearly:

This subclass is indented under subclass 698.51. Joint or connection wherein the position of the cutting element is adjustable along a straight line.

- (1) Note. Included herein are patents to a device which move, allow to move, or cause to move a rotary cutting tool axially with respect to a supporting arbor, or for axially moving an arbor for a rotary cutting tool along its bearing support.
- (2) Note. This subclass is not intended to provide for a connection to allow a rotary cutter carriage to slide along a rail.

698.71 For rectilinearly reciprocating tool:

This subclass is indented under subclass 698.11. Joint or connection wherein the tool is one intended to move to and fro along a straight line comprising means for (a) securing that tool to its support, or (b) for securing that tool to another tool, or (c) for securing a tool support that reciprocates with the tool to another reciprocating support.

- (1) Note. Included herein are patents to a stationary cutting tool, as distinguished from an anvil, that cooperates with a reciprocating tool to form a tool pair.

698.91 Tool is single element with continuous cutting edge (e.g., punch, etc.):

This subclass is indented under subclass 698.71. Joint or connection wherein the tool includes a sharp edge intended to penetrate the workpiece, which sharp edge extends such that it curves back on itself without interruption.

- (1) Note. This subclass is limited to patents to a connection for directly attaching a tool to a support.

699.11 Tool is single element reciprocable generally perpendicularly to elongate cutting edge (e.g., shear, etc.):

This subclass is indented under subclass 698.71. Joint or connection wherein the tool includes a sharp edge that extends a limited distance, and said edge extends substantially perpendicularly to the line of travel of the tool.

- (1) Note. This subclass is limited to patents to a connection for directly attaching a tool to a support.

699.21 Tool is single element reciprocable along elongate cutting edge (e.g., saw blade, etc.):

This subclass is indented under subclass 698.71. Joint or connection where in the tool is a long, thin blade having a cutting edge extending along the longitudinal axis thereof and parallel to the to-and-fro movement.

- (1) Note. This subclass is limited to patents to a connection for directly attaching a tool to a support.

699.31 Adjustable:

This subclass is indented under subclass 698.71. Joint or connection wherein means are provided which enable the cutting element of the tool to be positioned on its support, or in the case of a tool having multiple cutting elements, to be positioned relative to another cutting element.

SEE OR SEARCH THIS CLASS, SUBCLASS:

699.51, and see the search notes thereunder for other adjustable joints or connections under the class definition.

699.41 Rectilinearly:

This subclass is indented under subclass 699.31. Joint or connection wherein the cutting element is positionable along a straight line.

699.51 Adjustable:

This subclass is indented under subclass 698.11. Joint or connection wherein means are provided which enable the cutting element of the tool to be positioned on its support, or in the case of a tool having multiple cutting ele-

ments, to be positioned relative to another cutting element.

SEE OR SEARCH THIS CLASS, SUBCLASS:

527+, for a device wherein the means to vary the position of the tool on its holder serves to vary the limits of travel of the tool.

640+, for a device of the type found in this subclass which, as claimed, is embodied in a machine having means to drive or guide the tool in a rectilinearly reciprocatory path.

698.51+, for a rotary cutting tool or tool support including a joint or connection.

699.31+, for a reciprocating cutting tool or tool support including a joint or connection.

699.61 Rectilinearly:

This subclass is indented under subclass 699.51. Joint or connection wherein the cutting element is positionable along a straight line.

701 This subclass is indented under the class definition. Apparatus or method which is not in conformance with the definition of any prior subclass in this schedule.

- (1) Note. A special exception to the limitations expressed in these definitions (i.e., the limitations which require a moving tool and/or edge backup member) exists in the case of a machine wherein sound waves (e.g., supersonic sound) cause work to be cut through its thickness. Such a machine will be proper for this class and this subclass as apparatus for such cutting.

SEE OR SEARCH THIS CLASS, SUBCLASS:

13+, for the corresponding process.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses
104+ for apparatus or process for testing a cutting edge.

703 This subclass is indented under subclass 401. Device including means for sequentially moving the work in two distinct directions, namely

(a) work infeed motion along a path parallel to the plane of cut, and (b) transverse work motion in a direction generally perpendicular to the plane of cut; and wherein movements (a) and (b) are repeated.

- (1) Note. For the purpose of this definition, the means which permits movement of the work transverse to the plane of cut must have structure which at least facilitates such movement, e.g., work pusher, or a guide-like groove or track.

SEE OR SEARCH THIS CLASS, SUBCLASS:

284+, for a cutting tool which moves in two directions, namely (a) perpendicularly toward the work, and (b) parallel to the direction of movement of the work ("flying cutter").

704 This subclass is indented under subclass 703. Device including means to facilitate or cause alternating clockwise-counterwise rotational movement of the work about an axis parallel to the cutting plane when the work is out of contact with the cutting tool.

- (1) Note. This device is usually a "shingle-cutting" machine wherein the work supported by the feed carriage is given alternate outward cants (of each of the lead corners of the workpiece) into the plane of cut such that the work is tilted or slanted in a step-by-step fashion with respect to the feed carriage base or platform.
- (2) Note. A device having an alternately tilting or slanting gauge (thickness) plate, against which the lead edge of the work contacts as the work is being fed to the cutting zone, is found in this subclass (704).

705 This subclass is indented under subclass 704. Device wherein the means to facilitate the clockwise-counterclockwise rotational movement of the work is a member supplemental to the work moving means, which supplemental means contacts the work and positions it with respect to the cutting zone between successive cuts, but does not move with the work-moving means.

- 706** This subclass is indented under subclass 704. Device wherein the means to cause the clockwise-counterclockwise rotational movement of the work is a series of elements which hold or support the work, each element having a peripheral surface, any point of which moves in an arc-like path.
- (1) Note. This device usually is in the form of either a wheel or endless chain having a plurality of work engaging teeth spaced around the periphery thereof.
- 707** This subclass is indented under subclass 703. Device wherein the infeed means moves the work back and forth in a straight line path past a cutting zone, said back and forth movement constituting a cycle of work movement, wherein one complete cut is produced during each such cycle, and including a cutting tool at said zone having a cutting plane which is parallel to the direction of said work movement.
- (1) Note. These devices are generally known in the art as “slicers”.
- (2) Note. The infeed means is usually referred to as a “work-support” or a “work-carriage”.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
717+, for a “slicer” wherein the work is moved perpendicularly toward the plane of cut solely by the force of gravity upon the work.
- 708** This subclass is indented under subclass 707. Device including means for turning the work through a partial rotation about a centerline which is parallel to the straight line path, such turning occurring only when the work is out of contact with the tool, or including means to facilitate such a rotation of the work.
- (1) Note. The work turning means may be used to rotate the work while it is resting on the work support (carriage) or it may be used to transfer the work from a supply means directly to and onto the work carrier.
- 709** This subclass is indented under subclass 708. Device wherein the work turning means comprises a closed loop of flexible material, and wherein said means includes a plurality of pointed, work engaging projections spaced along the outside edge of said loop.
- 710** This subclass is indented under subclass 708. Device wherein the work turning means comprises a substantially rectangular reciprocating means which includes at least one pointed, work engaging projection located on the periphery closest to the work.
- (1) Note. For the purposes of this definition, the pointed work, engaging projection can include a pin, cog, tooth, hook, etc.
- (2) Note. A work engaging hook attached to a driving or pulling chain (nonendless) will be considered a device for this subclass.
- 711** This subclass is indented under subclass 710. Device wherein the rectangular means includes two or more work engaging projections.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
709, for a similar device wherein the plurality of teeth are attached to a rotating or revolving endless member.
- 712** This subclass is indented under subclass 711. Device wherein the work turning means is actuated by pneumatic or hydraulic power means.
- 713** This subclass is indented under subclass 707. Device including means for positively moving the work in a direction toward and substantially perpendicular to the cutting plane, such means being effective during the interval when the work is out of engagement with the cutter.
- (1) Note. The means which moves the work transversely may be advanced manually. However, if the transverse movement is caused by the operator grasping the work itself and pushing or pulling such work, the device will be found in subclass 707.
- (2) Note. The means for shifting the work transversely may be the force of gravity,

per se, (see subclass 717 indented here-under).

714 This subclass is indented under subclass 713. Device wherein the means for moving the work perpendicularly toward the cutting plane retracts the work from said plane after the cutting operation has been performed.

(1) Note. The alternate to-and-fro shifting of the work is for the purpose of aligning the work with the cutting plane prior to each cut and then clearing the work from the plane as it is reciprocated back to prepare for a subsequent pass or cut.

(2) Note. The means to move the work toward and away from the cutting plane must be structural. For devices wherein the transverse work-advancing means is moved manually, see subclass 713.

SEE OR SEARCH THIS CLASS, SUBCLASS:

724, for a similar device wherein a work retraction means is provided in addition to the means to move the work toward the cutting plane.

715 This subclass is indented under subclass 714. Device wherein actuation of the means to move the work perpendicularly is effected by an element which is a movable part of the infeed means.

(1) Note. The movable element is usually affixed to the wheel or axle of the work supporting carriage (infeed means) and rotates therewith, thus transmitting power to the transverse work-mover.

716 This subclass is indented under subclass 714. Device wherein actuation of the means to move the work perpendicularly is effected by an integral part of the work infeed means contacting a relative stationary means situated in the path of travel of the infeed means.

717 This subclass is indented under subclass 713. Device, including means to regulate or limit the distance that the work is moved perpendicularly toward the cutting plane.

(1) Note. Such means can comprise (a) baffle structure on the side of the cutting plane opposite the transverse work moving means so as to provide a work-stop abutment, (b) mechanical means (e.g., ratchet, screw) associated with the work moving means so as to regulate the distance the work is moved toward the cutting plane for each cutting cycle.

(2) Note. Devices relying on gravity as being the sole means for moving the work perpendicularly toward the cutting plane are found in this subclass (717).

718 This subclass is indented under subclass 717. Device wherein actuation of the means to move the work perpendicularly to the cutting plane is effected by or associated with means to cause or permit the work infeed motion.

SEE OR SEARCH THIS CLASS, SUBCLASS:

725, for a similar device having plural, work-pushing elements, which elements are actuated to move perpendicularly toward the cutting plane by the work infeed means.

719 This subclass is indented under subclass 717. Device wherein the movement of the work perpendicular to the cutting plane is effected by means which engages the work along a plane farthest removed from the plane of cut, and forces the work toward the plane of cut.

(1) Note. The pusher mechanism may be manually forced toward the cutting plane by grasping a handle associated with the pusher; see subclass 729 indented here-under.

720 This subclass is indented under subclass 719. Device including means to either (a) secure the work against relative movement with respect to the pusher element, or (b) adjust the work relative to the pusher element.

SEE OR SEARCH THIS CLASS, SUBCLASS:

409+, for a device wherein the work is moved through the cutting tool station (infeed) by a conveyor means, said

- means including a work constrainer (e.g., clamp, hook).
451+, for a work immobilizer or constrainer of general utility.
- 721** This subclass is indented under subclass 720. Device wherein the means to secure the work against movement includes means to adjust or move said securing means into or out of engagement with the work.
- 722** This subclass is indented under subclass 719. Device wherein two or more spaced, work engaging means are interconnected so as to concurrently produce a shifting of the work toward the cutting plane.
- 723** This subclass is indented under subclass 722. Device including means for varying the position of one pusher element relative to another.
- (1) Note. These devices are generally intended to accommodate a tapered work piece in such a manner that the side presented to the cutting plane will be parallel thereto.
- 724** This subclass is indented under subclass 722. Device including means to effect movement of the pusher elements away from the cutting plane.
- (1) Note. The retraction of the pusher elements away from the cutting plane is generally for the purpose of preparing the devices for the receipt of a new work piece.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
714+, for a similar device wherein the means which advances the work toward the cutting plane (e.g., pusher element) physically retracts the work from the cutting plane as well.
- 725** This subclass is indented under subclass 722. Device wherein at least one work engaging means is actuated by an intermediate means which utilizes energy transferred thereto by the movement of the infeed means.
- 726** This subclass is indented under subclass 722. Device wherein at least one work engaging means is actuated by pneumatic or hydraulic means.
- 727** This subclass is indented under subclass 722. Device wherein a work engaging means includes a threaded follower which is engaged by a threaded, rotatable shaft, the work engaging means being urged toward the cutting plane when the shaft is rotated.
- 728** This subclass is indented under subclass 722. Device wherein a work engaging means includes a rectilinear, toothed member attached to or integral with the underside thereof, and wherein said means is advanced toward the cutting plane by either (a) a driven, toothed gear means which engages said rectilinear member by intermeshing teeth therewith, or (b) a driven, reciprocating finger which engages a tooth of the rectilinear member on one stroke, and slides over that tooth on the return stroke.
- 729** This subclass is indented under subclass 719. Device wherein the pusher mechanism has associated therewith means adapted to be grasped by the hand of the user so as to impart movement thereto.
- 730** This subclass is indented under subclass 717. Device wherein the means to move the work transversely toward the cutting plane is a member which supports the work against gravity, which member includes means to limit the increments of said work movement.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
276+, for a cutting device including a reciprocating work-mover, wherein the tool engages the work during dwell of intermittent workfeed.
409+, for other rectilinear work-mover means including a work-constrainer.
425+, for a work supporting carriage which moves the work along a path which is parallel to the cutting plane.
435.11+, for a cutting device having a rectilinearly moving work carriage and tool adapted to cut parallel to the direction of and during work movement.

- 437.1+, for a cutting device having a rectilinearly moving work carriage and a tool, generally.
- 731** This subclass is indented under subclass 707. Device wherein the means for moving the work back and forth in a straight line (infeed) is a driven, flexible member.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 713+, for a device having such a driven, flexible member, and including means to positively move the work toward the cutting plane.
- 732** This subclass is indented under subclass 401. Device having active means, distinct from the work conveyor, for moving a work piece laterally of the direction of motion of the work-moving means.
- 733** This subclass is indented under subclass 401. Device in which the means to convey the work is restricted to rotate or oscillate around an axis which is stationary with respect to the zone of the cutter.
- 734** This subclass is indented under subclass 401. Device including a common mechanism to drive both the cutter-moving means and the work moving means.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 202+, for a tool engaging work during a dwell.
 284+, for a flying tool movement.
 350+, for a timed stroke synchronized with the tool.
- 743** This subclass is indented under the class definition. Device having means which engages a tool or tool support so as to define or limit the path (usually rectilinear) of movement of the tool, and means for attaching an element of the apparatus to the work to support or give additional support to the apparatus while the tool engages the work.
- (1) Note. For a listing of the subclasses in this class which include a clamping device, see section III, Subclass References to the Current Class, of the Class
- Definition and search notes for subclass 452, this class.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 454+, for a tool guide means combined with, or peculiarly related to, a work clamp.
 761+, and 821+, respectively, for a passive tool guide which directly engages the tool or tool support, or a tool guide, per se.
- SEE OR SEARCH CLASS:
 30, Cutlery, appropriate subclasses and particularly subclasses 371+, for a cutting device with a work engaging member which remains stationary with respect to the work and which provides support for, or movement to, the cutter, but does not guide, or assist in guiding, the cutter.
 173, Tool Driving or Impacting, subclasses 31+, for a tool driving device with means to engage the work to bear the weight of the drive means or resist the reactive force caused by the movement of the tool.
 269, Work Holders, appropriate subclasses, particularly subclasses 86+, for a work holder provided with a clamp.
- 744** This subclass is indented under subclass 743. Device in which the attaching means includes an elongated deformable member (e.g., cable, strap, series of articulated links) which conforms to a portion of the periphery of the work to affix it thereto.
- SEE OR SEARCH CLASS:
 100, Presses, appropriate subclasses and in particular subclass 212, for means for compressing material by rendering a flexible member taut around the material.
 269, Work Holders, subclasses 287+, for a holder which surrounds at least a portion of the work and substantially conforms to the outer periphery of the work.
- 745** This subclass is indented under subclass 743. Device in which the attaching means is so arranged that the tool engaging means, and any member utilized to support said engaging

- means are entirely supported against gravity by the work.
- 746** This subclass is indented under the class definition. Device having a cutting tool comprising a member of substantial length having a work cutting edge extending along its length, said member being adapted to move such that each point along the elongated cutting edge has a component of motion to-and-fro and generally parallel to said work cutting edge, and including a means for supporting a means for supporting or guiding said cutter to move to and fro.
- (1) Note. In the definitions of the subclasses indented hereunder, the phrase “cutting span” will be used to designate that portion of the moving cutting edge which is transiently in engagement with the work.
- (2) Note. A device having means to guide a reciprocable-along-elongated-edge type tool while it moves toward and/or through the work (i.e., infeed) and which relates to a reciprocable type tool, is placed in subclasses 746+ rather than subclasses 821+, since these devices function to guide the tool during its basic movement (i.e., to-and-fro reciprocations) and in addition, function to determine the direction of tool infeed movement and/or provide support for the tool.
- 747** This subclass is indented under subclass 746. Device provided with means which allows the tool to be oriented about an axis which is generally coextensive with the work-cutting edge, wherein the cutting edge can be oriented while the device is in operation.
- 748** This subclass is indented under subclass 746. Device provided with, (a) counterbalancing means to negate or neutralize the kinetic effect of the tool or (b) means to dissipate, or render less harmful, the vibrations or “jars” caused by the to-and-fro movements of the tool.
- 749** This subclass is indented under subclass 746. Device combined with one or more tools of the class type which are not of the reciprocable-along-elongated-edge type.
- 750** This subclass is indented under subclass 746. Device having means by which an addition, removal, or re-assembly of one or more of the parts of the device causes the device to become a cutting apparatus of the class type other than a “reciprocable-along-elongated-edge type”.
- 751** This subclass is indented under subclass 746. Device including two or more cutting tools capable of to-and-fro movement.
- (1) Note. The cutting tools can be mounted on a single tool support (e.g., “gang saws”) or upon separate tool supports and can be simultaneously usable or separately usable.
- 752** This subclass is indented under subclass 746. Device having means which absorbs part of the energy to move or assist in moving the tool in the opposite direction of said movement.
- 753** This subclass is indented under subclass 746. Device in which the tool has relative motion with respect to the device during (or between) the to-and-fro cutting movements in a direction having a component which is perpendicular to the cutting edge, and toward and through the work.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 202+, for a cutting device with means to bring the tool into cutting contact with the work during dwell of an intermittent workfeed.
- 284+, for a cutting device which includes means to move one or more tools into cutting engagement with the work while the work is moving through a cutting zone.
- 483+, for a movably mounted tool carrier for a rotatable disc-type tool.
- 794+, for a cutting device in which an endless flexible band-type tool is arranged to infeed.
- 754** This subclass is indented under subclass 753. Device provided with means ancillary to the tool or tool support for urging the tool to move toward and through the work or for checking or limiting the velocity with which the tool moves toward or through the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

202+, 284+, (See "SEARCH THIS CLASS SUBCLASS" of subclass 753).

487+, for a rotatable disc tool carrier with means to move said carrier during cutting.

523+, for means to apply a force to a tool to effect a cutting movement.

800, for a cutting device having an endless, flexible band type tool and means for promoting or regulating tool infeed.

SEE OR SEARCH CLASS:

173, Tool Driving or Impacting, subclasses 141+, for means for causing movement of a tool into or along the length of the work.

755 This subclass is indented under subclass 754. Device in which the ancillary means includes or comprises an elastically deformable member which exerts a force on the tool or tool support.

(1) Note. This subclass is not the locus for a tool guide element that is resilient and constantly urged into contact with the tool or tool support, unless such contact is specifically for the purpose of retarding or promoting infeed. Constantly-urged tool-contacting type guide structure may be found in subclasses 762+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

223+, for stored energy means for moving work or tool, which means is loaded by tool or work.

314, for a device having a resilient element which urged the tool toward a noncutting position.

348, for a device in which a first rotary tool cooperates with a second resiliently urged rotary tool.

756 This subclass is indented under subclass 754. Device in which the ancillary means has associated therewith means capable of modification or adjustment for effecting an increase or decrease in the velocity of infeed movement.

(1) Note. The associated means may consist of means for varying the impetus of the auxiliary means on the tool.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

324, for means to change the peripheral speed of a cutter blade which travels in a closed loop during a portion of the tool cycle.

403.1, for means to convey work relative to a tool station, combined with means to regulate work speed.

617, for means to vary force on or speed of tool during cutting stroke.

800, (See "SEARCH THIS CLASS, SUB-CLASS" of subclass 754).

SEE OR SEARCH CLASS:

173, Tool Driving or Impacting, subclasses 141+, for means for controlling the movement of a tool into or along work.

757 This subclass is indented under subclass 754. Device provided with means to cause to-and-fro tool motion in which the ancillary means is to be synchronized or interdependent with said to-and-fro motion causing means.

758 This subclass is indented under subclass 753. Device in which the tool has a to-and-fro movement along a straight line in addition to the infeed motion.

759 This subclass is indented under subclass 758. Device in which the tool infeed is effected by swinging the tool about a fixed point.

760 This subclass is indented under subclass 753. Device provided with means capable of stopping the motion of the tool toward or through the work.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

563+, for means for moving or permitting movement of a tool, to a retracted or noncutting position.

583+, for a device wherein stored energy furnishes the force for the return stroke.

- 587, for a device wherein stored energy furnishes only the cutting force.
- SEE OR SEARCH CLASS:
173, Tool Driving or Impacting, subclass 156, for lock or brake means to inhibit or prevent a tool from infeeding.
- 761** This subclass is indented under subclass 753. Device provided with means operative, without application of power thereto, to engage the tool or tool support to define or limit the path of movement (i.e., to direct, wholly or partially the path) of the tool during infeed motion.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
441.1, for passive tool guide means attached or operatively connected to means to guide moving work.
454, for tool guide means combined with or peculiarly related to work clamp.
820, for a device having an endless, flexible band type tool means to move said tool and special guide means for said tool.
821+, for a passive tool guide and various perfecting features for such guide.
- SEE OR SEARCH CLASS:
30, Cutlery, subclasses 286+, for a cutting tool provided with a guide.
187, Elevator, Industrial Lift Truck, or Stationary Lift for Vehicle, subclasses 406+ and 409+, for elevator guiding devices.
384, Bearings, subclasses 7+ linear bearing; e.g., slide type, per se.
- 762** This subclass is indented under subclass 761. Device wherein the passive means comprises two or more elements which, have faces spaced apart for passage of a tool therebetween.
- 763** This subclass is indented under subclass 762. Device wherein the passive means is capable of permitting at least one guide element to be moved toward and away from the other to vary the spacing between the guide elements or the effective space for passage of the tool.
- (1) Note. This subclass is not the locus for cutting devices having tool guide elements which are resilient and constantly urged toward one another. Such guide structure may be found in subclass 762.
- 764** This subclass is indented under subclass 762. Device provided with means permitting the tool guide element to be relocated or re-oriented with respect to the work or a work support means.
- 765** This subclass is indented under subclass 764. Device provided with two or more work support portions in which at least one portion thereof is capable of relative movement with respect to the other portion.
- (1) Note. The adjustment may result from the movement of the guide elements relative to the work support portions, or from the movement of one portion relative to the elements and other portion.
- SEE OR SEARCH CLASS:
269, Work Holders, subclasses 9+, for plural, selectively used work holders, and subclasses 37+, for plural holders for holding workpieces relative to one another.
- 766** This subclass is indented under subclass 764. Device provided with a work support surface, in which the relocating means permits the tool guide elements or work means to be turned about a line which extends generally parallel to the plane of the work support surface.
- 767** This subclass is indented under subclass 764. Device provided with a work support surface, in which the relocating means permits the tool guide elements or work support means to be turned about a line which extends generally perpendicular to the plane of the work support surface.
- 768** This subclass is indented under subclass 753. Device having means to cause the tool to follow a curved path.
- 769** This subclass is indented under subclass 753. Device in which the to-and-fro motion of the tool is effected about a point.
- 771** This subclass is indented under subclass 753. Device wherein the tool or tool support is supported by a to-and-fro moving carrying mem-

- ber including a shaft or pinlike device connected to the tool or tool support in a manner which permits the tool or tool support to turn freely there about.
- (1) Note. The tool or tool support is not supported by other machine structure during cutting but can be and normally is supported in part by the work or by the operator.
- (2) Note. The devices found herein are often referred to as “drag saws”.
- (3) Note. The tool infeed motion is usually produced by the movement of the tool around the pivot as the cut progresses.
- 772** This subclass is indented under subclass 771. Device in which the tool carrying member moves the pivot through an orbital path during cutting.
- 773** This subclass is indented under subclass 771. Device in which the tool carrying member oscillates about a line.
- 774** This subclass is indented under subclass 773. Device in which the line about which the tool carrying member is oscillated also moves during cutting.
- 775** This subclass is indented under subclass 771. Device in which the tool carrying member reciprocates in a straight line.
- 776** This subclass is indented under subclass 746. Device wherein means are provided which give the cutting tool a continuous or discontinuous reciprocating or oscillating motion in addition to the to-and-fro motion along its cutting edge, both the additional motion and the to-and-fro motion being in a plane common to all the motions and to the cutting span.
- (1) Note. The “additional motion” referred to above must be distinguished from the tool infeed motion of subclasses 753+. The “reciprocating motion” normally causes the tool to backfeed to separate the cutting edge from the work during a portion of the to-and-fro motion, and the “oscillating motion” normally causes the tool to rock during or between cutting strokes (for the purpose of removing waste material from the kerf, etc.).
- 777** This subclass is indented under subclass 776. Device in which the cutting tool is supported by two or more independent holding members, each of which members move to-and-fro about separate, spaced axes.
- 778** This subclass is indented under subclass 776. Device wherein the tool moves in a closed loop path in such a manner that the cutting edge is constantly maintained in parallel planes.
- 779** This subclass is indented under subclass 776. Device in which the reciprocating or oscillating motion includes movement of the tool about a line perpendicular to said plane while the tool is in cutting engagement with the work.
- 780** This subclass is indented under subclass 779. Device wherein the tool has a bearing portion adjacent one extremity thereof and said device is provided with elongated guide means supported so as to remain stationary during cutting, said guide means extending along the path of movement of said extremity of the tool and wherein said bearing portion engages said guide means to constrain said extremity to said path of movement.
- 781** This subclass is indented under subclass 746. Device including means to sustain the work against gravity, and means to permit re-orientation of the tool relative to said support means.
- 782** This subclass is indented under subclass 746. Device in which the tool is supported in such a manner that every point along the cutting edge reciprocates arcuately about a single stationary axis.
- 783** This subclass is indented under subclass 746. Device provided with means engaging the tool at each of its longitudinal extremities which means serve to sustain the tool against gravity.
- 784** This subclass is indented under subclass 783. Device in which energy to move the tool to-and-fro along its cutting edge is furnished at each of its longitudinal extremities either (a) simultaneously at each extremity or (b) alternately, first at one extremity and then the other.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
752, for stored energy drive in one direction of movement only (e.g., spring return type).
- 785** This subclass is indented under subclass 784. Device in which said tool-moving energy is furnished by wrapping, slipping, or passing a longitudinal extremity of the tool (or a flexible member attached to said extremity) over a wheel-like or circular member in such a manner that said extremity or flexible member is temporarily deformed (under the elastic limit) during tool movement.
- 786** This subclass is indented under subclass 784. Device in which each of the longitudinal extremities of the tool is connected to opposite ends of a substantially inflexible unitary frame, which frame is moved to-and-fro in a direction generally parallel to the cutting edge of the tool.
- 788** This subclass is indented under the class definition. Device wherein the tool member comprises either a plurality of cutter elements pivotally interconnected one with another forming a closed loop, or a continuous strip of material forming a closed loop and having a substantially continuous cutting edge on at least one edge thereof, and wherein said cutting loop is supported so as to be adapted to move around the closed path defined by said loop during the cutting operation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
871, for splitting by use of an endless band or chain knife.
- SEE OR SEARCH CLASS:
30, Cutlery, subclass 380 and 381+, respectively, for hand-manipulable band saw and chain saw devices.
474, Endless Belt Power Transmission Systems or Components, particularly subclasses 202+ for a positive drive belt; and subclasses 237+ for a friction drive belt.
- 789** This subclass is indented under subclass 788. Device including means to cause the tool member to carry out a predetermined sequence of operations or to cut a predetermined configuration, in response to an indicia carrying element, which element can be modified or substituted prior to beginning operation of the machine.
- (1) Note. Simple pattern-following devices are included herein.
- 790** This subclass is indented under subclass 788. Device including a cutter of the class type that is not of the endlessly orbiting type.
- 792** This subclass is indented under subclass 788. Device comprising two "cutting spans" in mutual contact over a substantial extent of the closed loop path of a single tool or of the paths of two adjacent tools, the spans moving in directions counter to each other.
- 793** This subclass is indented under subclass 788. Device having means by which an addition, removal or reassembly of one or more of the parts of the device causes the device to become a cutting apparatus of the class other than an endlessly orbiting type cutter.
- 794** This subclass is indented under subclass 788. Device provided with means for moving or permitting movement of the "cutting edge" in a plane in which the cutting span lies and in a direction having a component perpendicular to the "cutting edge" and toward and through the work.
- (1) Note. The term "plane" as used in this definition, is a generalized one, inasmuch as devices are in this and the indented subclasses in which the cutting span moves in a "plane" which is the surface of an imaginary cylinder.
- 795** This subclass is indented under subclass 794. Device in which the cutter is mounted on a ground-traversing carriage having wheels, skids, or crawler tracks for supporting the weight of the apparatus for rendering its movement bodily from one place to another expeditiously.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
928, for a cutting device of general utility mounted on a ground traversing vehicle.
- 796** This subclass is indented under subclass 794. Device in which the line representing the cutting span is moved or is permitted to move in a manner such that all points on the cutting span remain a fixed distance from a point.
- 797** This subclass is indented under subclass 796. Device wherein means are provided to change the plane in which the cutting span moves.
- 798** This subclass is indented under subclass 797. Device wherein the plane in which the cutting span moves is changed by rotating or swinging the cutter about a line lying in said original plane.
- 799** This subclass is indented under subclass 794. Device provided with means to permit the tool to be urged through the work only by gravitational attraction.
- 800** This subclass is indented under subclass 799. Device provided with means resisting the gravitational movement of the tool through the work, the resisting means being controlled by the valve-like effect of the flow of liquid or gaseous material, which flow is caused by the movement of the tool through the work.
- 801** This subclass is indented under subclass 794. Device wherein the moving means is actuated by a device that converts energy into motion.
- 802** This subclass is indented under subclass 788. Device including means to produce a perceptible visual manifestation of a condition of a part of the machine, or of a position or characteristic of the work.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
522, for a device having a scale or indicator.
- 803** This subclass is indented under subclass 788. Device wherein the cutting of work is accomplished by two or more cutting spans.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
792, for two contiguous cutting spans moving in directions counter to each other.
- 804** This subclass is indented under subclass 803. Device including means associated with the tool at each cutting span for varying the spacing between spans.
- 805** This subclass is indented under subclass 804. Device wherein the space varying means is a member pivoted about a fulcrum.
- 806** This subclass is indented under subclass 804. Device wherein the space varying means is a member having a helical rib thereon that is mated with a second member so that relative rotation between the members varies the spacing between cutting spans.
- 807** This subclass is indented under subclass 803. Device in which a projection of the path defined by the closed loop, on a plane perpendicular to the axes of the pulleys (about which the loop is wrapped), has the appearance of a closed loop which crosses itself.
- 808** This subclass is indented under subclass 803. Device wherein there are two or more band-knives having cutting spans.
- 809** This subclass is indented under subclass 788. Device including a work support surface and means to change the positional relationship of the band knife or band knife carrier relative to said surface.
- 810** This subclass is indented under subclass 809. Device provided with means to permit angular re-orientation of the cutting span plane relative to the work supporting surface plane.
- 811** This subclass is indented under subclass 810. Device in which the angular re-orientation of the cutting span is changed by rotating the band carrier relative to the work support surface.
- 812** This subclass is indented under subclass 811. Devices in which the band carrier is rotated about the line of crossing of the band-knife and the work support surface.

- 813** This subclass is indented under subclass 809. Device in which positional relationship between the plane of the cutting span and the plane of the work support surface is changed such that the distance between the cutting span and the work support surface is varied while maintaining the spatial orientation between the cutting span and the support surface.
- 814** This subclass is indented under subclass 788. Device provided with (a) means to adjust or increase the tension stress to which the closed loop tool is subjected or (b) means to prevent harm to the tool operator by undesired contact with the tool or to prevent damage to the tool by undesired contact with another machine part or work piece.
- (1) Note. This subclass is the locus for devices with means to intercept the band when it departs from its normal course of travel to prevent the band from making undesired contact with some other element.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
544+, for tool drive or guide means provided with guard means.
581.1, for means to subject a tool to a force tending to cause extension of the tool.
860, for a cutting machine frame provided with guard means.
- 815** This subclass is indented under subclass 814. Device provided with a nondriving, tool-engaging, wheel-like member, drum, or toothed wheel and means to impede the normal rotation of the member, drum, or wheel.
- 816** This subclass is indented under subclass 814. Device provided with two or more tool-engaging, wheel-like members and including means to adjust the relative spacing between the axes of said members.
- 817** This subclass is indented under subclass 816. Device including means to adjust the relative angle between said axes.
- 818** This subclass is indented under subclass 816. Device wherein a wheel-like member is continuously subjected to a force tending to move its axis.
- (1) Note. A weight acted on by gravity is considered to be a biasing force.
- 819** This subclass is indented under subclass 818. Device wherein the force tending to move the wheel-like member is a fluid or gaseous means.
- 820** This subclass is indented under subclass 788. Device provided with means to constrain the tool for motion in a path defining a cutting stroke or cycle.
- 821** This subclass is indented under subclass 523. Device having means to constrain the motion of a tool.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
820, for a tool and guide means.
- 823** This subclass is indented under subclass 821. Device in which at least one of the tool constraining elements which contacts the tool or tool support is mounted in such a manner so as to be free to move with respect to another element or with respect to the machine frame during the cutting operation.
- 824** This subclass is indented under subclass 821. Device in which the tool-constraining means includes at least one rotatable element (e.g., ball, roller, disc, etc.) which contacts the tool or tool support to reduce the resistance to motion of the tool, or in which at least a portion of the surface of the tool-constraining means is made of a material having friction-reducing characteristic (e.g., Teflon).
- 825** This subclass is indented under subclass 824. Device in which the rotatable element is a wheel-like member and includes, in addition to its cylindrical surface, at least one additional cylindrical planar or conical, circumferential surface which also contacts the tool so as to render said element capable of limiting tool movement in more than one direction.

- 826 This subclass is indented under subclass 824. Device in which the rotatable element is a wheel-like member having at least one planar or conical surface which contacts the tool or tool support, which element has an axis of rotation perpendicular to the planar surface or coextensive with the axis of the conical surface.
- 827 This subclass is indented under subclass 821. Device in which the tool constraining means includes two or more elements spaced apart for passage of the tool or tool support therebetween, wherein means are provided for permitting at least one of said elements to be moved in a direction substantially toward or away from the opposed element.
- 828 This subclass is indented under subclass 827. Device wherein the movement of one of said elements is along a straight line.
- 829 This subclass is indented under subclass 821. Device in which all tool contacting elements of the tool-constraining means may be moved (or relocated) in unison with respect to a discrete portion of the apparatus designed to remain stationary during cutting, e.g. machine frame.
- 830 This subclass is indented under the class definition. Device comprising (a) a plurality of serially-connected cutting elements joined in a manner which permits each element to have movement relative to all other of said elements or (b) a cutting element for use in (a).
- SEE OR SEARCH THIS CLASS, SUBCLASS:
788+, for a cutting device which employs an endless band or chain knife.
- 831 This subclass is indented under subclass 830. Device wherein means are provided to permit the individual cutting elements to be nondestructively disconnected from the assemblage.
- 832 This subclass is indented under subclass 830. Device comprising a plurality of cutting elements of differing size or configuration.
- (1) Note. "Diverse cutter elements" does not include allochiral cutting teeth, unless combined with a tooth or element of another type.
- (2) Note. "Raker teeth" are considered to be cutting elements.
- 833 This subclass is indented under subclass 832. Device including means to limit the penetration of the cutting elements into the work.
- 834 This subclass is indented under subclass 830. Device including means to limit the penetration of the cutting elements into the work.
- 835 This subclass is indented under subclass 651. Device comprising (a) a member having a pair of relatively closely spaced, generally oppositely facing surfaces joined by a relatively narrow marginal surface and a cutter assemblage mounted or formed on said marginal surface throughout a substantial portion of its longitudinal extent, said cutter assemblage comprising a plurality of seriatly arranged cutter elements each having a cutter edge; said device being used to produce a line of cut by movement along the longitudinal extent of said marginal surface, or (b) a cutter element or cutter assemblage disclosed for use in (a).
- 836 Device under 835 provided with means permitting the location of a cutter element to be changed relative to the member.
- 837 This subclass is indented under subclass 835. Device provided with means, in addition to the seriatly arranged cutter elements, which means performs another operation of the class type upon the work.
- (1) Note. In determining whether the cutting means is additional to, or part of the seriatly arranged elements; the test is whether the cutting means extends to the margin of the blade; if it does it is not an additional element, but a part of the seriatly arranged elements.
- 838 This subclass is indented under subclass 835. Device comprising two or more parts adapted to be nondestructively disconnected from each other.

839 This subclass is indented under subclass 838. Device in which an individual cutter element is adapted to be disconnected from the marginal surface.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

838, for a device wherein the entire cutting edge is removable from the blade in a unitary piece, or a device wherein the tool is formed from a plurality of multi-toothed sections.

840 This subclass is indented under subclass 839. Device having securing means which engages both said cutter element and said member, serving to fasten them together, and is separable from both the cutter element and the member to which the cutter element is attached.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

698.11+, for joints and connections of general utility in cutting devices.

845, for teeth which have a spring formed from the same material as the tooth itself.

841 This subclass is indented under subclass 840. Device in which the securing means is moved in a plane perpendicular to the generally oppositely facing surfaces to connect or disconnect the cutter element from the marginal surfaces.

842 This subclass is indented under subclass 840. Device in which the securing means is rotatively moved to connect or disconnect the cutting element from the marginal surface.

843 This subclass is indented under subclass 842. Device in which separate means is provided to positively engage the securing means and prevent undesired movement thereof.

844 This subclass is indented under subclass 840. Device in which the securing means is moved in a straight line to connect or disconnect the cutting element from the marginal surface.

845 This subclass is indented under subclass 839. Device wherein the cutter element is connected or disconnected by changing its shape or shape of the member to which it is connected.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

839, for a device in which the tooth is connected to the blade by an independent spring element.

846 This subclass is indented under subclass 835. Device in which; (a) the configuration or size of the individual cutter elements, or (b) the distance between adjacent cutter elements, changes gradually and constantly throughout a substantial portion of the longitudinal extent of the cutter assemblage.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

847, for a series of teeth positioned in a wave-form pattern.

851, for a series of teeth of nonuniform variation.

847 This subclass is indented under subclass 835. Device wherein the cutter elements are positioned or sized such that a projection of the points of the cutter elements most remote from the marginal face onto a plane parallel to one of the oppositely facing surfaces of the device produces a series of points lying in a curvilinear, wavelike path.

848 This subclass is indented under subclass 835. Device in which a cutter assemblage comprises two or more sets of cutter elements, each set consisting of a plurality of equally-spaced cutter elements identical in size and configuration to one another.

(1) Note. Cutting elements which are alike in all particulars, but are mirror images of one another are considered as being of "identical size and configuration".

849 This subclass is indented under subclass 848. Device wherein at least one of the sets consists of cutter elements having cutting edges inclined relative to the oppositely facing surfaces and lying in a plane which is perpendicular to the oppositely facing surfaces and parallel to the intended direction of movement.

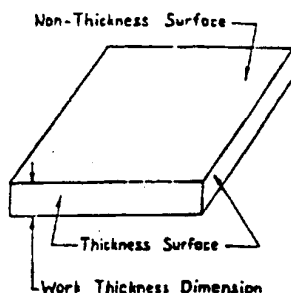
850 This subclass is indented under subclass 848. Device wherein at least some of the sets are separated by a cutter element whose cutting

- edge is inclined relatively to the oppositely facing surfaces and lies in a plane which is perpendicular to the oppositely facing surfaces and parallel to the direction of intended movement.
- 851** This subclass is indented under subclass 835. Device wherein each cutter element of the cutter assemblage is of a size or configuration different than the next adjacent cutter element.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
846, for similar devices wherein the variation of the teeth varies uniformly.
- 852** This subclass is indented under subclass 835. Device wherein each cutter element of the assemblage is reversely congruent (i.e., mirror-image-like) relative to the next adjacent cutter element.
- 853** This subclass is indented under subclass 835. Device in which a projection upon a plane perpendicular to the oppositely facing surfaces of a substantial extent of the cutting edge of a tooth is a continuous line.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
830+, for a chain saw teeth having a similar occurrence of transversely curved cutting edge.
- 854** This subclass is indented under subclass 835. Device in which the cutter elements have a substantial length of cutting edge lying in a plane, all points of which are equidistant from one of the oppositely facing surfaces of the blade.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
837+, for a device in which a side-mounted cutter element has a cutting edge extending parallel to the blade, e.g., "planar cutters".
- 855** This subclass is indented under subclass 835. Device wherein the cutter element has a cutting edge, a substantial portion of which lies in a straight line which intersects the oppositely facing surface at an angle of 90°.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
849, for a device having a plurality of such teeth positioned in groups of two or more.
- 856** This subclass is indented under subclass 651. Device wherein the tool has no motion of its own during its cutting operation.
- 857** This subclass is indented under subclass 856. Device having one cutting edge in each of two intersecting planes or coplanar edges which intersect; e.g., scissors-type cutting edges, or co-planar edges with tangents which intersect.
- 858** This subclass is indented under subclass 856. Device having two or more cutting edges which extend in nonintersecting planes.
- 859** This subclass is indented under the class definition. Device including a structural unit or housing which provides an environment for a cutting tool.
- SEE OR SEARCH CLASS:
72, Metal Deforming, subclasses 455+ for similar machine frames for metal deforming machines.
248, Supports, appropriate subclass for other machine frame structures.
- 860** This subclass is indented under subclass 859. Device wherein a portion of the housing serves to prevent harm to the machine operator or damage to the cutting tool.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
397+, for interrelated tool actuating means and guard moving means.
440.2, for guards functioning as a work guide.
478, for a rotatable disc tool or tool and carrier having a guard associated therewith.
544+, for a driven tool and guard therefore.

861 OTHER THAN COMPLETELY THROUGH WORK THICKNESS OR THROUGH WORK PRESENTED:

This subclass is indented under the class definition. Method or apparatus utilizing a tool which: (a) is disclosed as limited to engage operatively only one of the nonthickness work surfaces (and which may or may not engage operatively a thickness work surface), or (b) has operative (i.e., cutting) engagement with only a thickness face and which is constrained to an operative path lying between the non-thickness faces, or (c) has a tool stroke* in a single rectilinear path, which stroke fails to completely cut all the work lying before it in the direction of its cutting path (even though the resulting line of cut may extend entirely through the thickness of the work).

- (1) Note. A thickness surface is one along which the “work thickness” may be measured. See the illustration below.



“Nonthickness Surface”; “Thickness Surface”;
“Work Thickness Dimension”

- (2) Note. For a patent to be placed originally in this or indented subclasses, it is not required that the contemplated type of cutting be distinctly claimed. It is sufficient that the claimed means be disclosed as functioning within the limitations above defined.
- (3) Note. Where the tool operates to produce a mere indentation or distortion of surface material (i.e., without severing the work surface fibers), as for instance, by creasing, forging, or metal rolling, or combines cutting with a significant material flow, as for instance in sheet

forming and in plastic working, then the patent for such defined subject matter is excluded from this class and will be classified in other classes according to material worked on, type of operation performed, or machine disclosed.

- (4) Note. Where the disclosed apparatus is directed to subject matter as above defined but the claimed recitation is limited to a cutter, per se, then the patent for such is originally placed in a subclass of tools, per se (651+).
- (5) Note. Where a tool element penetrates partially through the thickness of a workpiece and thereafter continues to coact with an opposed tool element, which opposed tool element completes the severance of the workpiece in the cutting plane extended of the first tool, then the combined cut through the work is considered the same as the product of a single coacting tool pair and the patent directed to such subject matter is excluded from this subclass and those indented thereunder and will be found elsewhere in the schedule. However, if the first said tool is withdrawn from the workpiece before the complete severance occurs (i.e., no coaction occurs between said elements) then the first tool element is considered to be a scorer means and the opposed tool element a through cutter, and a patent disclosing same is placed as an original copy in this or indented subclasses.
- (6) Note. The main body of the class (subclasses 13+) always should be included in the search for a particular process, or apparatus, for cutting partially through the thickness of the work, which process or apparatus additionally may be applied to cutting entirely through the work thickness.

SEE OR SEARCH CLASS:

- 12, Boot and Shoe Making, appropriate subclasses for combined operations in making footwear including cutting

- other than through the thickness of the material; Class 101, Printing, subclasses 3+ for related art in specific manufactures.
- 69, Leather Manufactures, for cutting and/or scoring method or means relating to specific manufactures, particularly subclasses 9+ and 21.5 the generic loci of patents directed to apparatus and process, respectively, for splitting or skiving of leather.
- 72, Metal Deforming, appropriate die-pressing subclasses; e.g., subclasses 343+ for channeling, grooving, or partially penetrating with a punchlike tool
- 101, Printing, subclasses 3.1+ for related art in printing.
- 493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, appropriate subclasses for combined operations in making a product from a sheet or web including cutting other than through the thickness of the material.
- 862 Combined types of cutting:**
This subclass is indented under subclass 861. Method or apparatus including a first cutting action combined with a second cutting action under the class definition wherein the first cutting action is separately classified from the second cutting action.
- 863 Including use of rotary scoring blade:**
This subclass is indented under subclass 862. Method or apparatus including use of a tool turning about an axis to incise work (without removing material) by either (a) penetration of a nonthickness surface, but to a depth insufficient to reach an opposite nonthickness surface, or (b) penetration of a thickness surface only to a depth insufficient to produce a lamina.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
886, for scoring, per se, by a rotary blade.
- 864 Plural independent rotary scoring blades:**
This subclass is indented under subclass 863. Method or apparatus comprising use of a first cutting tool that is generally planar and circular in shape, adapted to rotate about an axis normal to the planar surface of the tool during cutting, including a cutting edge extending generally about the circular perimeter; and use of a second cutting tool that is also generally planar and circular in shape, adapted to rotate about an axis normal to the planar surface thereof during cutting, including a cutting edge extending generally about the circular perimeter.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
884, for apparatus including plural rotary scoring tools not in combination with additional cutting means.
- 865 With infeeding of work:**
This subclass is indented under subclass 862. Method or apparatus including the step of or means for causing the workpiece to move toward a tool to effect cutting of the workpiece.
- 866 Pricking:**
This subclass is indented under subclass 861. Method or apparatus wherein the tool utilized is pointed and functions to pierce (without removing material) a single work surface only, thus, forming a crater which generally conforms to the shape of the tool.
- SEE OR SEARCH CLASS:
12, Boot and Shoe Making, subclass 17 and 42 for a sole or heel pricking device in a shoe making machine.
- 867 Including use of orbiting tool carrier:**
This subclass is indented under subclass 866. Method or apparatus including use of structure to support the cutting tool against gravity and carry that tool in a fixed path that describes an endless loop.
- 868 With infeeding of tool:**
This subclass is indented under subclass 866. Method or apparatus including the step of or means for causing the tool to move toward a workpiece to effect the cutting of the workpiece.
- 869 Edge trimming (e.g., chamfering, etc.):**
This subclass is indented under subclass 861. Method or apparatus wherein the tool utilized functions to remove a portion of work defined by the junction areas of a thickness and a nonthickness face.

- (1) Note. Excluded from this subclass is a patent for a process or apparatus for merely slitting such a junction area, as the operation of slitting itself is not considered to entail removal of a work portion. However, a patent may properly be placed herein where a plurality of slitters coact to remove a portion of edge material.
- (2) Note. In general, the patent of this subclass discloses removal of a work portion planarly by a single tool. However, a patent directed to the formation of an edge furrow or channel, by either a single tool or multiple tools, would be admitted to this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

875, for a groover, broadly.

879, for a slitter, broadly.

870 Splitting:

This subclass is indented under subclass 861. Method or apparatus wherein the tool utilized functions to penetrate a thickness work surface only and is constrained in its cutting stroke, or in its movement relative to the work to a path lying between the nonthickness work surfaces so as to define product laminae.

- (1) Note. It is not required that the tool proceed completely through the work, i.e., width and/or longitudinal extent. The requirement that laminae be produced is significant.
- (2) Note. The definition of the term “splitting” may be different in other arts; see, for instance, that relied on in Class 69, Leather Manufactures, subclass 9 wherein a cutting path parallel to the work surfaces is required.

SEE OR SEARCH THIS CLASS, SUBCLASS:

879, for a cutting tool which enters a thickness face but fails to produce a lamina, as by merely cutting a groove.

871 By use of endless band or chain knife:

This subclass is indented under subclass 870. Process or apparatus comprising use of (a) a cutting tool that is made of a continuous strip of material forming a closed loop and having a substantially continuous cutting edge on at least one edge thereof wherein said continuous strip cutting tool is supported to move along a closed path defined by said loop during cutting to present a different portion of the cutting edge to the workpiece without affecting the overall relationship of the cutting tool and the workpiece; or (b) a series of pivotally interconnected, sequentially acting cutting tools, each including a cutting edge arranged in a closed loop so that each of the tools follows a preceding cutting tool to cut in the manner of a continuous strip cutting tool.

SEE OR SEARCH THIS CLASS, SUBCLASS:

788, for means for cutting, generally, by an endless or chain knife.

872, for similar cutting by a circular blade having a continuous cutting edge.

872 By use of rotary blade:

This subclass is indented under subclass 870. Method or apparatus comprising use of a cutting tool that is generally planar and circular in shape, adapted to rotate about an axis normal to the planar surface of the cutting tool during cutting, including a cutting edge extending generally about the circular perimeter.

873 Plural independent rotary blades:

This subclass is indented under subclass 872. Method or apparatus comprising use of a first cutting tool that is generally planar and circular in shape, adapted to rotate about an axis normal to the planar surface of the tool during cutting, including a cutting edge extending generally about the circular perimeter; and use of a second cutting tool that is also generally planar and circular in shape, adapted to rotate about an axis normal to the planar surface thereof during cutting, including a cutting edge extending generally about the circular perimeter.

874 With infeeding of work:

This subclass is indented under subclass 870. Method or apparatus including the step of or means for causing the workpiece to move toward a tool to effect cutting of the workpiece.

875 Grooving:

This subclass is indented under subclass 861. Method or apparatus including use of a tool comprising: (a) a unitary member which includes a gouge element, the member adapted to remove a section of the workpiece to define a furrow or channel; or (b) coacting slitter elements (with or without a cooperating gouge means) which coact to remove material and leave a channel as above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

869, for grooving to trim an edge of a workpiece.

917, for a notching device.

SEE OR SEARCH CLASS:

409, Gear Cutting, Milling, or Planing, subclasses 288+ for a grooving device and see the note in this class (83) under the class definition, section II, Lines With Other Classes, subsection A, paragraph 9, f.

876 This subclass is indented under subclass 875. By use of plural independent rotary blades: Method or apparatus comprising use of a first cutting tool that is generally planar and circular in shape, adapted to rotate about an axis normal to the planar surface of the tool during cutting, including a cutting edge extending generally about the circular perimeter; and use of a second cutting tool that is also generally planar and circular in shape, adapted to rotate about an axis normal to the planar surface thereof during cutting, including a cutting edge extending generally about the circular perimeter.

877 Forming common groove:

This subclass is indented under subclass 876. Method or apparatus wherein the first cutting tool serves to form a portion of the groove, the second cutting tool serves to form a portion of the same groove, either simultaneously or sequentially.

878 Blades turning about perpendicular axes:

This subclass is indented under subclass 876. Method or apparatus wherein the axes about which the cutting tools turn are normal to each other when viewed along the direction of relative infeed of the cutting tool and the workpiece.

879 Scoring:

This subclass is indented under subclass 861. Method or apparatus including use of a tool to incise work (without removing material) by either (a) penetration of a nonthickness surface, but to a depth insufficient to reach an opposite nonthickness surface, or (b) penetration of a thickness surface only to a depth insufficient to produce a lamina.

(1) Note. Annually scoring of a workpiece preparatory to breaking a hole there-through is included in this subclass.

SEE OR SEARCH CLASS:

30, Cutlery, subclasses 164.9+ for a hand tool or a work supported tool for scoring (or marking) material.

33, Geometrical Instruments, subclasses 18.1+ for mechanically guided relatively travelling means to mark work in a predetermined pattern, including scratching or scoring, said subclasses have not been screened for patents fitting the definition of this subclass.

125, Stone Working, appropriate subclass for a scoring device disclosed as being adapted to mark natural material in or removed from the ground.

225, Severing by Tearing or Breaking, subclasses 96+ for an implement or machine for preliminarily weakening (as by scoring) and subsequently breaking a workpiece.

451, Abrading, for a scoring device wherein marking is done by the abrasive action of a natural cutting media (e.g., by the action of a nonartificially formed diamond tipped tool).

493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, subclasses 396+ for "scoring" of a sheet or web by deforming rather than by cutting.

880 Processes:

This subclass is indented under subclass 879.
Method of scoring .

881 Active means to control depth of score:

This subclass is indented under subclass 879.
Apparatus wherein means are actuated to coact with such tool to limit the extend of penetration thereof.

- (1) Note. The term “actuated means”, contemplates and requires more than a merely adjustable and otherwise fixed member.

882 Serially:

This subclass is indented under subclass 879.
Apparatus wherein means are provided to score sequentially, a single workpiece, by either the same or multiple tools.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

881, for repetitive and alternative cutting and scoring by the same tool.

883 Plural independent scoring blades:

This subclass is indented under subclass 879.
Apparatus including a first incising tool and a second, separately supported, incising tool.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

869, and 875+, for grooving by coating plural tools.

882, for plural scorers operated sequentially.

884 Rotary scoring blades:

This subclass is indented under subclass 883.
Apparatus comprising a first cutting tool that is generally planar and circular in shape, adapted to rotate about an axis normal to the planar surface of the tool during cutting, including a cutting edge extending generally about the circular perimeter; and a second cutting tool that is also generally planar and circular in shape, adapted to rotate about an axis normal to the planar surface thereof during cutting, including a cutting edge extending generally about the circular perimeter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

864, for the method or apparatus for cutting by plural rotary cutting tools combined with additional cutting of a different type.

885 On opposite sides of work:

This subclass is indented under subclass 884.
Apparatus wherein the first cutting tool serves to incise a first surface of the workpiece and the second cutting tool serves to incise the workpiece from the surface thereof that is directly across the workpiece from the first surface, so that the cutting action of the first tool approaches the second tool and the cutting action of the second tool approaches the first tool.

886 Rotary scoring blade:

This subclass is indented under subclass 879.
Apparatus wherein the incising tool is adapted to turn about an axis during the cutting operation.

887 With means to rotate blade:

This subclass is indented under subclass 886.
Apparatus including means other than the workpiece to engage the cutting tool and cause the tool to rotate.

CROSS-REFERENCE ART COLLECTIONS

The following subclasses are collections of published disclosures pertaining to various specified aspects of the cutting art which aspects do not form appropriate bases for subclasses in the foregoing classification (i.e., subclasses superior hereto in the schedule), wherein original copies of patents are placed on the basis of proximate function of the apparatus. These subclasses assist a search based on remote function of the apparatus and may be of further assistance to the searcher, either as a starting point in searching this class or as an indication of further related fields of search inside or outside the class. Thus, there is here provided a second access for retrieval of a limited number of types of disclosures.

- (1) Note. Disclosures are placed in these subclasses for their value as references and as leads to appropriate main or secondary fields of search, without regard to their original classification or their claimed subject matter.

- (2) Note. The disclosures found in the following subclasses are examples, only, of the indicated subject matter, and in no instance do they represent the entire extent of the prior art.
- 901** Cutting blanks from web material for use as collars.
- 902** A cutting device mounted on and driven by or in timed relation to a machine which is not of the cutting type.
- (1) Note. A disclosure of an attachment for cutting up waste product from a cutting machine is found in subclass 923. The attachments disclosed in publications of this subclass (902) serve other purposes, such as performing a cutting operation on work before, during, or subsequent to its processing in the principal machine.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
923, for waste product cutting; and see (1) Note, above.
- SEE OR SEARCH CLASS:
112, Sewing, subclasses 122+, for a trimmer combined with a sewing machine; and subclasses 285-301, for a thread cutter combined with a sewing machine.
- 903** Severing excess material (flash, etc.) from a cast grid for a storage battery, usually in one operation by appropriately formed shearing dies.
- (1) Note. Battery grid trimming is usually a typical die-cutting operation, characterized by special facilities for handling the work and product rapidly and efficiently by making use of projecting lugs on the double-grid castings.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
268, for disclosures of machine in which work slides by gravity against a gauge or stop in the tool zone.
914, for flash trimming in general.
- SEE OR SEARCH CLASS:
29, Metal Working, subclass 2, for battery grid making.
- 904** Cutting a thumb index notch or overlapping cutout portions of different extents in the edges of book pages.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
917, for notching in general.
- 905** Cutting a closed-end slit or slot in flexible material for use as a button hole.
- SEE OR SEARCH CLASS:
112, Sewing, subclasses 65+ for button-hole making in general.
- 906** Cutting solid material into shreds, flakes, pellets, or dice of fairly uniform shape and size.
- (1) Note. This process is often termed "pelletizing".
- SEE OR SEARCH CLASS:
29, Metal Working, subclasses 4.51+ for shredding metal; e.g., metal wool making.
241, Solid Material Comminution or Disintegration, appropriate subclasses, for comminution in general.
- 907** Severing wire while it is in the form of a substantially helical coil; e.g., cutting coil springs to length.
- (1) Note. The peculiar problems involved in feeding, gauging, holding, and cutting the wire in coiled form tend to impart special characteristics to these machines not found in straight wire cutters.
- SEE OR SEARCH CLASS:
140, Wireworking, appropriate subclasses, for cutting coiled wire combined with other article-manufacturing step(s).
- 908** Producing an article having salient portions, by cutting away the waste portions therebetween.
- (1) Note. The articles are often produced in pairs, the waste from one article being

left intact to constitute the salient portions of the other article.

SEE OR SEARCH CLASS:

- 29, Metal Working, appropriate subclasses, for manufacture of toothed metallic articles.
- 76, Metal Tools and Implements, Making, appropriate subclasses, for saw blade making.
- 409, Gear Cutting, Milling, or Planing, subclasses 1+ for gear cutting, generally.

909 Severing a filament (thread, wire, etc.) which projects from or is attached to an article.

- (1) Note. Device disclosed as cutting thread to strip a bobbin is found in Class 28, Textiles: Manufacturing subclass 295.

SEE OR SEARCH CLASS:

- 30, Cutlery, appropriate subclasses, for a thread or string cutter.
- 242, Winding, Tensioning, or Guiding, subclasses 487.1+ for a disclosure of cutting a strand following the operation of winding it on a holder.
- 445, Electric Lamp or Space Discharge Component or Device Manufacturing, subclasses 23+ for a disclosure of severing surplus lead wire from the base of a lamp bulb or discharge tube, combined with other operation(s).

910 Severing surplus base fabric extending beyond the limits or contour of an embroidered design.

- (1) Note. This operation is analogous to flash trimming, for which search subclass 914, but is often accomplished by incidental distortion of the material, a feature not found in trimming solid objects such as rubber heels.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 914, for flash trimming, generally.

911 Performing die cutting, or a succession of cutting and notching operations, to produce a flat piece of paper of suitable contour for later folding and gluing into envelope form.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 300, and 303, for an envelope blank cutter of the flying type.

SEE OR SEARCH CLASS:

- 493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web, subclasses 186+ for an envelope machine in general.

912 Cutting through an envelope adjacent one edge thereof so as to gain access to its contents without damaging them.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 418, for an envelope opener provided with a work locator.

SEE OR SEARCH CLASS:

- 30, Cutlery, appropriate subclasses, for an envelope opening device with movable cutting blade.

913 Cutting a continuous filament or rope of filaments into predetermined short lengths (preparatory to spinning into yarn, or other textile operation).

- (1) Note. The staple length may be constant; or the machine may be designed to produce periodically fluctuating lengths, or graduated lengths within a predetermined range.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 403, for a Beria-type cutter.

SEE OR SEARCH CLASS:

- 19, Textiles: Fiber Preparation, subclasses .3+ for continuous "tow-to-top" stabilizing method or means; or for staple fiber producing method or means combined with a mechanical textile process or apparatus.

914 Severing the flash, fin, sprue or other excess material from a cast, forged or molded article.

- (1) Note. The flash trimming operation may be carried out by “recutting” the article in a finishing die; or the article may be manipulated or moved in proximity to a relatively small cutting tool equipped with a work guide to protect the finished edge of the work (for which, see subclass 445).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

445, and see (1) Note above.

SEE OR SEARCH CLASS:

59, Chain, Staple, and Horseshoe Making, subclass 29 for means for trimming flash from a chain link.

915 Severing animal pelts.

- (1) Note. Fur cutters often are characterized by the provision of special work-holding means, such as impaling or gripping pins, and devices to hold the hair out of the path of the moving tool. Frequently, the cut is made along a zigzag line (see subclass 918, pinking).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

333, for a pinking wheel.

374+, and 451+, for work-immobilizer other than a clamp (e.g., impaling pin(s), or suction gripper).

918, for pinking in general, and see (1) Note above.

SEE OR SEARCH CLASS:

69, Leather Manufactures, appropriate subclasses, for a fur working method or apparatus, in general.

915.3 Machines for cutting larger masses of ice into smaller blocks or cubes.

915.5 Cutting thin sections, usually of organic tissue, for microscopic examination.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

170, for a device having means to modify the temperature of a part of the device or the work.

401, for a device having means to move the work to and/or against the tool.

409+, for a device having means to hold the work on a work carrier which moves the work to and/or against the tool.

699.51, for a device having means to adjustably hold the tool.

916 Severing work along a desired line of cut by means of successive overlapping notches with relative movement between the work and tool between each notching cut.

- (1) Note. Work may be severed along a desired line of cut by means of overlapping slitting cuts, without removal of material. Disclosures of machines for doing work of this slitting type may be found, together with nibbling machines, in subclass 237.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

237, and 249, for nibbling machine of the subclass 202 type.

556+, for tool positioning means synchronized with cutting stroke (such tool may make overlapping cuts on stationary workpiece).

565, for template-surface-following tool.

917, and associated search notes, for notching.

917 Cutting one or more products from one edge of a workpiece, leaving portions of the original edge intact.

- (1) Note. A notch is a nonlinear cut through the thickness of a workpiece, extending inwardly from one edge of the workpiece and returning to the same edge.

- (2) Note. The notch may be cut in an exterior or an interior edge of work.

- (3) Note. The severing of work along a desired line of cut by a succession of overlapping notches is called “nibbling”, for which see subclass 916 of this class; or, if done in the form of a nonlinear repetitive pattern which leaves none of the original edge intact, is called “pinking” or “scalloping”, for which see subclass 918.

- (4) Note. Key cutters (notchers) are found here, rather than in subclass 908.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 651+, for a notching tool, per se.
 904, 908, 916, 918, for other disclosures of notching or similar operations.
 911, for notching associated with envelope blank forming.
 926, for fringing or slashing (no product removed), or corner cutting.
- SEE OR SEARCH CLASS:
 30, Cutlery, for a notching implement.
 234, Selective Cutting (e.g., Punching), subclasses 47+, for a selective card-notching device.
 409, Gear Cutting, Milling, or Planing, subclasses 1+ for gear cutting, generally.
- 918** Severing work into two products by a nonlinear, generally zigzag, repetitive pattern cut upon a portion of the work other than its edge.
- (1) Note. This subclass includes scalloping, and is not restricted to cutting any particular work (such as textile fabric).
- (2) Note. See (3) Note, in subclass 917, supra. Pinking does not include the severance, from an edge of the work, of one or more generally triangular pieces so as to leave a recognizable part of the original edge.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 333, for a pinking wheel.
 904, 915, 917, for a notching operation.
- SEE OR SEARCH CLASS:
 30, Cutlery, for a pinking implement (shears).
- 919** Cutting a small piece, or sample, from a workpiece which may be stationary, in motion, or undergoing treatment in some stage of a manufacturing process.
- (1) Note. Some cutting machines are capable of taking samples by modification of
- their normal cutting cycle, when desired, by intervention of the operator. (See subclass 57).
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 57, for cyclic operation disturbed by manually actuated means; and see (1) Note, above.
- SEE OR SEARCH CLASS:
 73, Measuring and Testing, subclasses 421+ for a sampler or toller in general.
- 920** Cutting roofing shingles from a web of composition material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 300, and 303, for flying-type shingle cutter.
 704+, for a wood-shingle cutting device wherein the work is moved in two directions along a path parallel in to the plane of cut and in a direction transverse to the plane of cut.
- 921** Means for cutting continuous slide fastener stock to desired length and/or gapping the product, i.e., cutting away the lugs or stringer scoops in certain areas.
- (1) Note. Gapping is the removal of lugs or fastener elements from the tape throughout a desired area, to facilitate subsequent sewing of the tape to fabric or articles of clothing. It is usually accomplished by shearing through the lugs and brushing the remnants loose from the tape.
- SEE OR SEARCH CLASS:
 29, Metal Working, subclass 33.2 and 408+, for slide fastener manufacturing.
- 922** Cutting of sticky or tacky material, usually in tape form.
- (1) Note. The web-contacting parts of a tacky web handling machine are usually of special design to facilitate passage of the web through the machine, without

sticking or jamming or the accumulation of adhesive on the machine parts.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 28, for method of handling a tacky product after cutting.
276, for a work-feed element which contacts and moves with work (which work may comprise tacky tape).

SEE OR SEARCH CLASS:

- 225, Severing by Tearing or Breaking, appropriate subclasses, particularly subclass 24, 25 and 57, for a device for severing a tacky tape by tearing or breaking.

923 Cutting up the scrap or undesired portion of the product of a cutting or other treating machine as to facilitate its storage or disposal.

- (1) Note. The scrap cutter may consist of a more or less complete cutting machine attached to and driven with or by the principal machine, or it may be merely one or more cutting elements added to an actuated tool of the machine, to cut up the scrap simultaneously with formation of the desired product.
(2) Note. The term "waste product" refers to a by-product in process of being turned out by a treating machine.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 906, for a disclosure relating to chip or particle making.

924 Cutting work presented in the form of a coil, coating, or layer surrounding a central element which is to be left uncut.

- (1) Note. Examples: wire insulation stripper, cable sheath cutter, means to cut wire hood holder on milk bottle.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 909, for cutting a strand extending from a package or support.

SEE OR SEARCH CLASS:

- 28, Textiles: Manufacturing, subclasses 292+ for bobbin strippers, in general.
242, Winding, Tensioning, or Guiding, appropriate subclasses, for winding and cutting the so wound material.

927 Device for cutting, scoring, or grooving a printer's rule in the manufacture thereof.

928 A cutting tool carrier which is supported on a conveyance which is driven or traversed over the ground or other horizontal surface to the location where the tool is to be used.

SEE OR SEARCH CLASS:

- 30, Cutlery, subclass 379 for a vehicle mounted saw wherein the saw support and vehicle are moved together randomly with respect to work during cutting; and subclass 379.5 for a vehicle mounted saw wherein the saw support structure moves relatively to the vehicle and randomly relatively to the work during cutting.
144, Woodworking, subclasses 34.1+ for cutting structure that is vehicle mounted and is combined with means such as a tree pusher to assist the cutter operation in tree felling.

929 PARTICULAR NATURE OF WORK OR PRODUCT:

Performing a cutting operation (1) on work which possesses unusual or unique characteristic, or (2) producing a product having an unusual or unique characteristic.

- (1) Note. A disclosure may be placed in this subclass because of: (a) an unusual feature of the machine adapting it to handle a particular kind of work, or (b) unusual or particular work, per se, (e.g., a germanium wafer for transistor manufacture, or a banknote voided by a cutting action).

929.1 Printed circuit board:

This subclass is indented under subclass 929. A collection of art relating to cutting or punching of a generally planar sheet on which an integral electrical conductor has been, or is intended to be, provided.

929.2 Electrical component lead trimming:

This subclass is indented under subclass 929. A collection of art relating to cutting an external conductor of an electrical circuit element (e.g., a resistor, a capacitor, a transistor, etc.).

930 Radioactive:

This subclass is indented under subclass 929. Performing a cutting operation , wherein the work or product radiates alpha or beta particles.

- (1) Note. The material of this subclass commonly comprises spent nuclear fuel rods.

931 Tobacco:

This subclass is indented under subclass 929. Performing a cutting operation , wherein the work or product is tobacco or tobacco-like material.

932 Edible:

This subclass is indented under subclass 929. Performing a cutting operation , wherein the work or product is suitable for consumption by a man or an animal.

- (1) Note. Chewing gum is considered to be "edible".

933 Book, being destroyed; e.g., cover being cut away:

This subclass is indented under subclass 929. Performing a cutting operation , wherein the work is an assembly of sheets of paper and is reduced by the cutting operation to a different form.

934 Book, being made; e.g., trimming a signature:

This subclass is indented under subclass 929. Performing a cutting operation , wherein the work comprises sheets of paper being cut, as part of assembling or otherwise forming an assembly of the sheets for subsequent viewing.

- (1) Note. Cutting performed during re-binding a book is included herein.

935 Endless band:

This subclass is indented under subclass 929. Performing a cutting operation , wherein the work or product is doubled back on itself so that it has no beginning and no end.

- (1) Note. The work may comprise a tube which is cut perpendicularly to its axial extent to form an endless band.

936 Cloth or leather:

This subclass is indented under subclass 929. Performing a cutting operation wherein the work or product is woven from strands or is made of cured animal skin.

- (1) Note. Cutting a shoe heel, sole or upper is included in this art collection and those indented hereunder, even if the heel, sole or upper is made of material other than cloth or leather.

937 From continuous or wound supply:

This subclass is indented under subclass 936. Performing a cutting operation including means to supply work such that there is no recognized terminal end of the work; or including means to advance the lead end of a coil of work.

938 Moving cloth or leather:

This subclass is indented under subclass 936. Performing a cutting operation including provision to allow movement of the work during the cutting operation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

952, for similar structure, wherein the work is not restricted to cloth or leather.

939 With work support:

This subclass is indented under subclass 936. Performing a cutting operation including means to hold the work against the force of gravity during the cutting operation.

- (1) Note. Cutting a shoe heel, sole or upper is included in this art collection and those indented hereunder, even if the heel, sole or upper is made of material other than cloth or leather.

- SEE OR SEARCH THIS CLASS, SUBCLASS:
953, for similar art collection wherein the work is not limited to cloth or leather.
- 940 Cutter moves along bar, bar moves perpendicularly:**
This subclass is indented under subclass 939. Performing a cutting operation including an elongated member to support the cutting tool with provision to allow movement of the cutting tool there along, and including means to support the elongated member with provision to allow movement of the elongated member at a right angle with respect to its elongated extent.
- 941 Work support comprising penetratable bed:**
This subclass is indented under subclass 940. Performing a cutting operation wherein the means to hold the work against the force of gravity is made of material that can be readily entered by the cutting tool, without damage to that material.
- 942 Contact pin of electrical component:**
This subclass is indented under subclass 929. Performing a cutting operation wherein the material being cut comprises an assembly for transmission and utilization of electrical energy which assembly has an elongated connection terminal which is trimmed.
- 943 Pallet:**
This subclass is indented under subclass 929. Performing a cutting operation wherein the material being cut comprises an assembly made for support of material above a subordinate supporting surface, the cutting operation comprising severing one component of the assembly from another.
- 944 Syringe needle:**
This subclass is indented under subclass 929. Performing a cutting operation wherein the work comprises a tubular rod previously intended for penetration of skin to transmit fluid there beneath.
- 945 Separating connected articles:**
This subclass is indented under subclass 929. Performing a cutting operation wherein the work comprises a web carrying a series of distinct elements (usually similar elements) comprising cutting the web to allow one of the elements to be moved away from another.
- 946 Container:**
This subclass is indented under subclass 929. Performing a cutting operation wherein the work or product includes a chamber intended for storage of material.
- (1) Note. A land or water vessel, or building is not considered to be a container for placement herein.
- 947 Insulation about wire:**
This subclass is indented under subclass 929. Performing a cutting operation wherein the work comprises a nonconductive sheath enclosing a conductive strand comprising cutting the sheath without cutting the strand.
- 948 Having "memory"; e.g., photos:graphic or magnetic film:**
This subclass is indented under subclass 929. Performing a cutting operation wherein the work or product is intended to be coated or otherwise modified to store information thereon.
- 949 Continuous or wound supply:**
This subclass is indented under subclass 929. Performing a cutting operation including means to supply work such that there is no recognized terminal end of the work, or including means to advance the lead end of a coil of work.
- 950 Strandlike:**
This subclass is indented under subclass 949. Performing a cutting operation wherein the work or product is generally elongated and round in cross-section.
- 951 Rubber tire:**
This subclass is indented under subclass 929. Performing a cutting operation wherein the work comprises an annular polymeric member for fitting about a wheel and carrying a load.
- 952 Moving work:**
This subclass is indented under subclass 929. Performing a cutting operation including provision to allow movement of the material being cut during the cutting operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

938, for a similar collection wherein the material is cloth or leather.

953 With work support:

This subclass is indented under subclass 929. Performing a cutting operation including means to hold the material being cut against the force of gravity during the cutting operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

939+, for similar art collection wherein the work material is cloth or leather.

954 KNIFE CHANGING:

Performing a cutting operation including provision to allow replacement of the component having a sharp cutting edge.

955 CUTTER EDGE SHIFTABLE TO PRESENT DIFFERENT PORTION OF EDGE:

Performing a cutting operation including provision to allow repositioning of the component having a sharp cutting edge to utilize a previously unused portion thereof.

956 ULTRASONIC:

A collection of art relating to cutting by use of high frequency energy.

- (1) Note. These frequencies are generally considered to be greater than the highest frequency discernible to the human ear.

FOREIGN ART COLLECTIONS

The definitions for FOR 100 - FOR 102 below correspond to the definitions of the abolished subclasses under Class 83 from which these collections were formed. See the Foreign Art Collection schedule for specific correspondences. [**Note:** the titles and definitions for *indented* art collections include all the details of the one(s) that are hierarchically superior.]

FOR 100

Foreign art collection wherein the work moving means is of rigid construction and is adapted to support the work against gravity and which support moves relative to the tool station in a fixed rectilinear path.

FOR 101

Foreign art collection in which the work-moving means itself moves in the arc of a circle in peripheral engagement with the work, thereby moving the work in a straight path.

FOR 102

Foreign art collection in which the work-moving means itself moves in a straight line while in engagement with the work.

END